

# Some Xerophytic Ferns Worthy of Cultivation

W. C. BLASDALE

One associates ferns with habitats in which there is an abundance of soil-moisture, a humid atmosphere and at least partial shade, for it is in regions that insure these conditions that the number of species is at a maximum. Nevertheless the arid and semi-arid regions of the southwestern portion of the United States, as well as the mountainous regions of the states bordering the Pacific, are the homes of a large number of species which are true xerophytes. Many of them have decided ornamental value; others possess attractions akin to the oddities of form and structure peculiar to succulents.

Most of the species concerned are representatives of the genera *Pellaea*, *Cheilanthes* and *Notholaena*. They differ from the more widely cultivated ferns in that the expanded leaf surfaces are reduced to a minimum as a result of thickening and subdivision of the fronds, and by the presence of scales or fibers, which form a woolly or cottony tomentum, or of farinose or sticky secretions derived from small glandular hairs found on the lower leaf surfaces. To these peculiarities should be added certain features of the life-cycle, especially an unusually long rest-period during which there is not only complete cessation of growth but apparent extinction of life itself, although advent of the rainy season causes the curled, bone-dry fronds to expand and once more assume their normal functions. In this respect they resemble certain mosses and lichens, or still more, certain of the desert inhabiting selaginellas. Just why the active cells of these plants are able to survive a degree of dehydration fatal to most plants is a mystery. Specimens which have

reached such a degree of dryness are not likely to appeal to the artistic sensibilities of the average gardener, nor is it probable that many gardeners could provide the conditions which bring about such a degree of dehydration. As to the behavior of ferns of the desert type, when given an opportunity to develop under normal conditions we have but little data; at least some of them not only tolerate such changes but retain the pleasing features of their short growth period throughout the yearly cycle. Further there are rock ferns of a less extreme type, largely mountain plants frequenting rocky crevices and gravelly talus slopes, which are known to be adaptable to a wide range of soil and climatic conditions. At least twenty-five species could be selected from these two groups which give promise of becoming useful additions to our long list of alpiners and rock plants which can be grown far beyond the limits of their natural habitats. Some of these are already found in the trade lists of certain nurserymen. I will consider here only those with which I have had some experience.

*Pityrogramma triangularis* (Kaulf.) Maxon. I will first describe the fern known throughout California as the Goldenback owing to a dense coating of yellow or white powder which completely covers the lower surface of the fronds. This powder consists of a white wax mixed with a yellow complex compound to which the name ceroptene has been given. The fronds are made up of a four- to ten-inch stipe and a nearly deltoid blade which sometimes reaches a spread of four inches. The root system is superficial but extensive.



Fig. 3. *Pellaea compacta*, grown in gravelly soil in an exposed situation. Photographed against an artificial background. Height of fronds five inches.

Fig. 4. *Cheilanthes gracillima*, growing in crevices of granite rock at 7,000 ft., near Echo Lake, California.



1678

*Fig. 5. Pellaea ornithopsis, growing in the University of California Botanic Garden, 1936.*

Though usually found in the partial shade of low-growing shrubs, in a soil which may be either leaf-mould or clay, it is one of the first plants to succumb at the beginning of the dry season, causing the blades to curl into compact balls and giving no indications of being alive. They exist in this state during the six or more months of the dry season but if left undisturbed expand into their normal form with the arrival of the first rains. With only moderate shade and occasional watering, even in ordinary garden soils, the fronds remain expanded throughout the year and make attractive plants. Since this species ranges from British Columbia to Mexico, occasionally reaching elevations of 4,000 feet, it should be hardy over large areas in the United States. In nature it reproduces abundantly through spores; there should be no difficulty in propagating it on a large scale.

*Cryptogramma acrosticoides* R. Brown. The American Rock Brake is widely distributed in the mountain ranges of the West. In the Sierra Nevada one finds its thickly matted rootstocks wedged between the shells which peel off from exposed granitic slopes of the higher peaks. The broad pinnae of its bright-green sterile fronds contrast pleasingly with its erect clusters of fertile fronds which they surround. It is a fine rock plant at sea level but takes some time to become established.

*Pellaea andromedaefolia* Fee. The species of this genus are distinguished by their small elliptical pinnae, whose edges curl backward to form an indusium which protects the sporangia as in the genus *Pteris*. This species, known locally as the Coffee Fern, is one of the largest and on the whole is the best for use as an ornamental feature of a garden border in either sun or shade. Its fronds do not curl up during the dry season and with very

little water yield tangled masses (Fig. 1) which may attain a height of sixteen inches. It spreads rapidly by means of deep-seated rootstocks. The fronds, like those of many ferns, persist for years after becoming lifeless and detract from the beauty of the younger growth. It is desirable therefore to cut all of the foliage back to the ground from time to time in order to eliminate this defect.

*Pellaea Bridgesii* Hook. is another crevice plant from the mountains of California and Idaho and is rarely found below 6,000 feet. Its gray-green, pinnate fronds fringe the edges of horizontal rock crevices (Fig. 2) but the root stocks from which these fronds are derived extend far back into their depths. Though perfectly hardy, it is a difficult species to establish but is well worth the effort it may cost to do so.

*Pellaea Breweri* Eaton frequents the same kinds of habitats as the preceding species but at lower altitudes. Casual observers fail to distinguish it from that species but it is easily identified by the presence of ear-like appendages to the lower edges of the lower part of the rachis. I have had no experience in growing it but suspect that it is more amenable to sea-level conditions than *P. Bridgesii*.

*Pellaea compacta* Maxon frequents the more arid regions of California and Arizona. Specimens of it collected in Arizona were grown without difficulty in a well-ventilated greenhouse where they were given full exposure to the sun. They succeeded (Fig. 3) even better on a bed of gravel in the rockery. Like all of the species of *Pellaea*, it is easily increased by division of its rootstocks.

*Pellaea densa* Hook. is a smaller species, widely distributed in the mountain regions of the western states. It is one of the most pleasing and most easily grown of all rock ferns. The deltoid





Fig. 6. *Notholaena sinuata*, grown in heavy soil exposed to full sunshine. Height of immature (about half-grown) fronds seven inches. Berkeley, California.

leaf blades are borne on short delicate stipes forming extensive masses of light green foliage which harmonize with many of the true alpine.

*Pellaea ornithopus* Hook., known as the Bird's Foot or the Tea Fern, is a more nearly typical xerophyte. It frequents rocky outcrops where the soil is thin and shade entirely lacking. Although its fronds do not curl, an attempt to gather specimens of it during the dry season yields only a mass of crumbling fragments. Its cultural needs are most easily satisfied in a cactus garden (Fig. 5) and the form and color of its foliage are in harmony with such surroundings.

*Cheilanthes gracillima* Eaton. In the species of this genus also, the sporangia appear in a line near the edges of the pinnae and are covered by their up-turned edges, but the indusia thus formed are thinner and narrower than in the species of *Pellaea*. Further, in most of the species the pinnae are divided into small bead-like segments and invested with thin scales or fibers. These facts find expression in the term Lace Fern with which the species are associated. This one is especially adapted to narrow rock crevices (Fig. 4) where there is a bare modicum of soil. It is a common species in the mountains of California and parts of Canada and is easily grown either as a pot plant or on beds of gravelly soil.

*Notholaena Parryi* Eaton. These are distinctively desert-inhabiting species, most of them of small size. They closely resemble the species of *Cheilanthes* but

lack an indument, which deficiency is replaced by a great abundance of white or brown scales or threads, from which they are known as Cotton Ferns. This species is rather frequent in the desert regions of California and Arizona. It yields narrow three- to five-inch fronds which are green and glabrous above but appear to be made up of a series of symmetrically-arranged blobs of brown cotton threads when viewed from below. Although it is scarcely possible to duplicate the boulder-strewn wastes to which it is accustomed I have found it possible to grow it as a pot plant with a fair degree of success.

*Notholaena sinuata* Kaulf. This is one of the larger species distinguished by its long narrow pinnate fronds whose broad pinnae are disposed alternately on the rachis (Fig. 6). Though discovered in Mexico and described in 1824, it was later found in Texas, New Mexico and California and is reported from Peru and Chile. Although long cultivated in England as a "stove" plant, it does not appear to have been grown in the United States until recently. Through specimens collected by Mr. Eric Walther of the Golden Gate Park in San Francisco "on dry volcanic rocks on the easterly foot of Popocatepetl," it was introduced into California recently and has proven well adapted to general culture in spite of heavy soils, severe frosts and wet winters. It is a remarkably handsome fern and gives promise of being adaptable to a wide variety of climates and exposures.



Fig. 1. A general view of Sajsaihuaman rocks.

## The Ornamental Flora of the Rocky Cliffs of Sajsaihuaman, Cuzco, Peru

CÉSAR VARGAS C.

For many years I have been observing, in different seasons of the year, the flora of the rocky cliffs, for the most part calcareous, that are found near the thousand-year-old fortress of Sajsaihuaman (on a hill to the north of the city of Cuzco) in whose concavities, fissures and interstices there are growing many plants, perhaps more than sixty species. Those which claim my attention now, however, are those which through the beauty of their flowers give the title to this article. (See Fig. 1.)

It is truly something to be wondered at how these hard rocks, for the most part exposed, can shelter in the tiniest space plants whose conspicuous and brilliantly colored flowers make them

into great natural gardens. Here one may admire (naturally in certain seasons of the year) the yellow-orange, red-orange, red and cream flowers of species of *Stenomesson*, *Crocopsis*, etc., some of which spring from the fissures of the hard and dry rocks, weathered by cold and heat—as if in defiance of these hostile factors.

How many times, stooping down, I have contemplated minutes on end, asking myself what mysterious force these delicate plants possessed to make their way through the hard soil full of stones and sharp rocks. But the creative forces of Nature, who knows all in advance, have protected the floral scapes (particularly in the *Amaryllis* and *Iris*



Fig. 2. *Pitcairnia ferruginea*.



Fig. 3. *Eustephia coccinea*.

families) with bracts that strongly enclose the tender bracts while they emerge from the dry and hostile earth.

Among the flora to which I allude, the Amaryllidaceae surpass the rest as ornamentals. These are the most abundant in this locality and flower at the end of winter and in the spring for the most part, then the Iridaceae, Polemoniaceae, Oenotheraceae, etc. As I believe this botanical essay is of interest to horticulturists, I am going to give brief descriptions of the species of the ornamental flora, adding data with reference to the times of their flowering and reproduction. Most of them are illustrated by my own photographs or sketches.

#### BROMELIACEAE

*Pitcairnia ferruginea* R. at P. (Fig. 2). Perennial plant, 1 m. in height, to the tip of its inflorescence; the inflorescence, panicle, pyramidal, covered

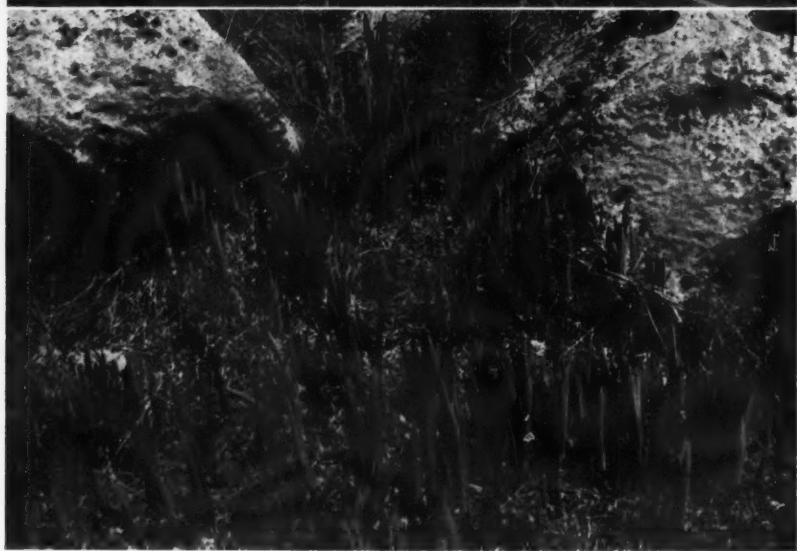
with ferrugineous, stellate scales; floral bracts acute, longer than the pedicels, flowers 2-2.5 cm. long, densely ferrugineous, petals greenish, 1.5 cm. long, longer than the sepals. The size of the plant and of its parts varies with the altitude and the climate. (See Flora of Peru, by J. F. Macbride, Vol. XII, p. 526: Pub. 363, 1936.) Flowers from November to March.

Reproduction — by seeds or lateral buds which complete their growth in three years and then flower.

#### AMARYLLIDACEAE

*Eustephia coccinea* Cav. (Fig. 3). Up to 60 cm. high, with the leaves usually developing after the flowers, but sometimes as seen in the picture, flowers 2-5, perianth bright red, green tipped, 3-4 cm. long. Flowers in August until November. Widely distributed in southern Peru.

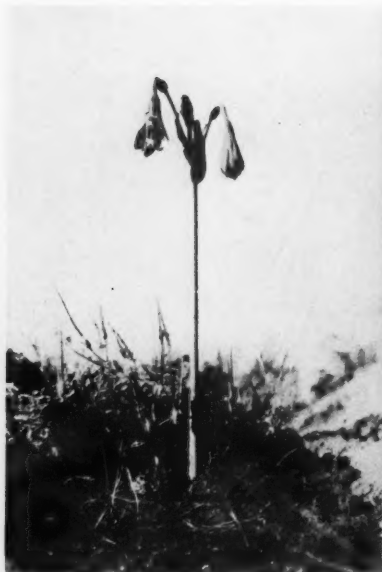
Reproduction — bulbs or bulblets,



*Fig. 4. Stenomesson Pearcei (upper).*

*Fig. 5. Stenomesson variegatum (lower).*



Fig. 6. *Stenomeson aurantiacum*.Fig. 7. *Bomarea involucrosa*.

which are formed about the principal mother bulb.

*Stenomeson aurantiacum* (HBK) Herb. (Fig. 6). From 25-30 cm. high. Bulb subglobose, leaves linear, developed after flowering, flowers 2-6, perianth red-orange, 3.5-4 cm. long, cup simple and acute, toothed in my specimen. Flowers, at times, from the end of May until August.

Reproduction—bulbs and bulblets.

*Stenomeson Pearcei* Baker (Fig. 4). Up to 80 cm. high, leaves sometimes developed after flowering and sometimes with the flowers; flowers 5-8, perianth 1.5 cm. long, with broad limb, yellow-cream, green-tipped, cup teeth bifid. Flowers from the end of May until September.

Reproduction—like the last cited.

*Stenomeson variegatum* (R. et P.) Macbr. (Fig. 5). Undoubtedly one of

the most beautiful of the genus because of the beauty and size of its flowers; peduncle up to 1 m. or more, flowers 2-6 or more, pedicels short, slightly curved, perianth tube 8-10 cm. long, bright red, green keeled at the apex, cup bifid. Flowers in December and January.

Reproduction—like the last.

*Bomarea involucrosa* (Herb.) Baker. (Fig. 7). An erect herb up to 2 m. high, densely leafy throughout, recurved at summit; leaves linear-lanceolate, 12-22 cm. long, 8-12 mm. wide, flowers up to 20; primary rays short, 6-9 mm. long, forked once or very rarely twice, floral bracts transparent white, perianth up to 7 cm. long, cream green-tinged. Flowers from November to January.

Reproduction—Seeds.

*Bomarea ovata* (Cav.) Mirb. (Fig.

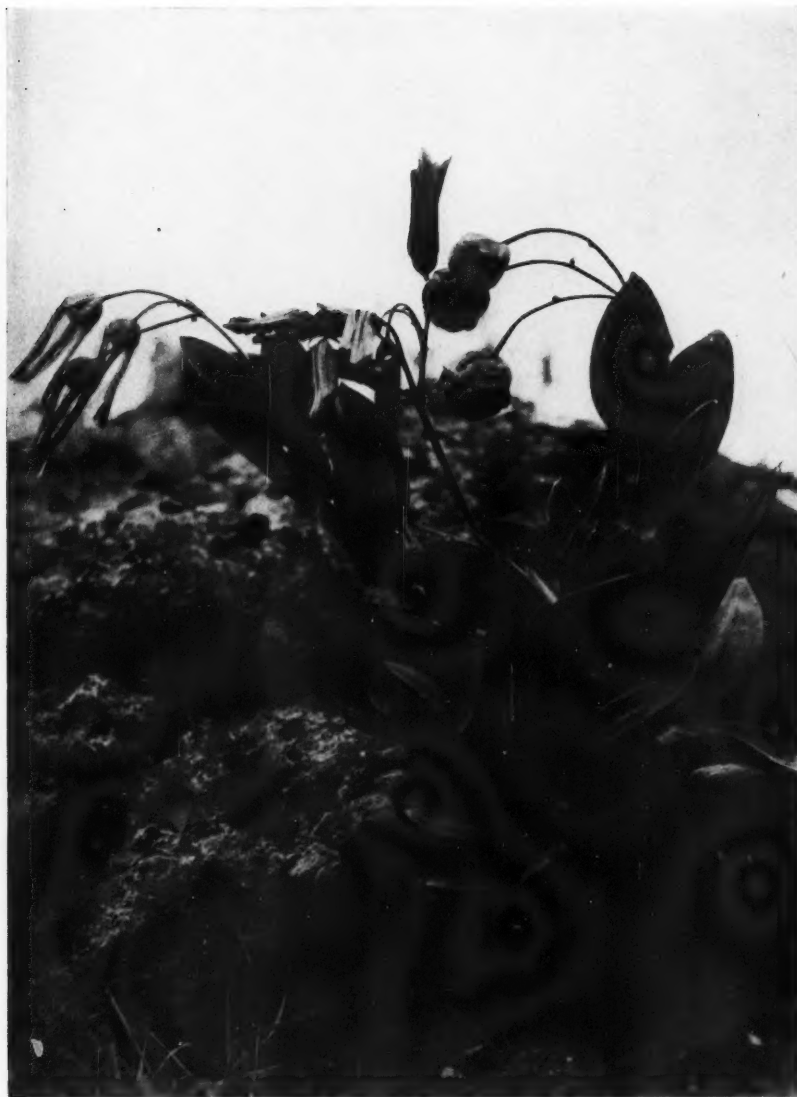


Fig. 8. *Bomarea ovata*.



Fig. 9. *Cypella Herrera*



Fig. 10. *Loasa Cuzcoensis*; Fig. 11. *Cajophora Pentlandii*

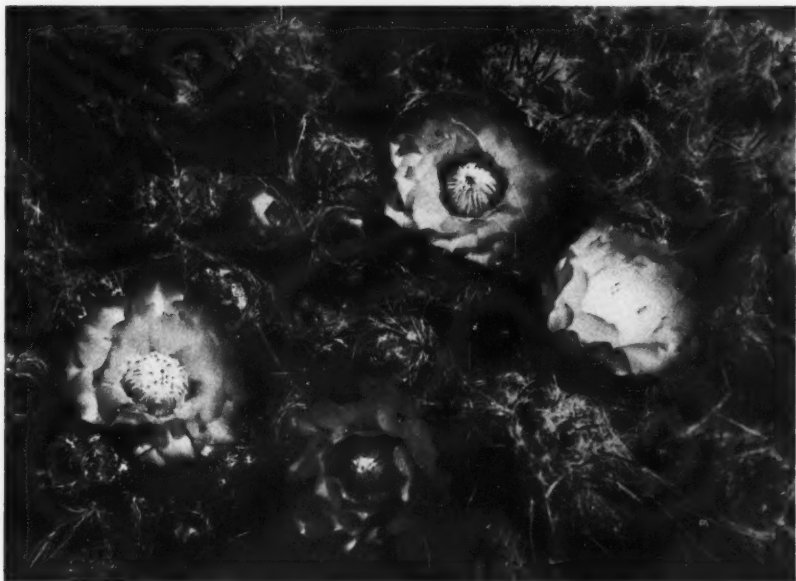


Fig. 12. *Opuntia floccosa*



Fig. 13. *Lobivia corbula*

8). In this rocky habitat, generally suberect, as seen in the picture. Floral rays 6-8, flowers about 3 cm. long, sepals dark red, green-tipped, petals green dotted purple, subequal. Flowers from November to March.

Reproduction—seeds.

*Crocopsis fulgens* Pax (Fig. 17). Leaves linear 9-28 cm. long, 2-2.5 mm. wide, developed after the flowers; bulb ovate, long neck; flowers solitary, red orange and black dotted when dry, rising directly from the bulb (like a crocus) 6 cm. long. Flowers from September to November.

Reproduction—Bulbs, Bulblets.

*Urccolina peruviana* (Presl.) Macbr. Bulb globose, leaves developed after the flowers, narrowed at each end and wide at the middle, about 3.5 cm. wide, peduncle 12-20 cm. long, flowers, stamens and stigma exerted. Flowers from July to October.

Reproduction—like the last.

#### IRIDACEAE

*Sisyrinchium Jamesonii* Baker. 6-20 cm. high, root fasciculate, leaves many sessile, linear; flowers yellow, 12-16 cm. long, fruit a capsule. Flowers from February to April.

Reproduction—Seeds.

*Sisyrinchium chilensis* Hook. 20-40 cm. high; root fasciculate, leaves almost sessile linear-lanceolate, dentate, 20-30 cm. long, 2-3 wide. Inflorescence a long spike with 5-6 blue flowers, pedicels 15-25 mm. long, with bracts like the leaves but much smaller and acute. Flowers February to April.

Reproduction—Seeds.

*Cypella Herrera* Diels. (Fig. 9). Bulb from 2-3 cm. long to 10-14 mm. wide, leaves linear, acute, nerved, 10-20 cm. long or more, 3-4 mm. wide; flower usually solitary or rarely 2, peduncle 20-40 cm. long, with two bracts 4 cm. long, 5-6 cm. wide, perianth blue 3-4 cm. in diameter. Flowers from De-





*Fig. 14. Fuchsia macrantha*



Fig. 15. *Cantua candelilla*

cember to April, each one of very brief duration, opening in the morning and closing toward evening.

Reproduction—Bulbs; because I have never obtained it from seeds, possibly sterile.

#### LOASACEAE

*Loasa Cuzcoensis* Killip (Fig. 10). Prefers to protect itself in the shade of the rocks. 40-60 cm. high, upright; stalk and leaves densely covered with brown spines 3-4 mm. long, leaves 6.5-10 cm. long and 5.5-6.5 cm. wide. Many flowers pedicels 15-20 mm. long, slightly curved at summit, calyx persistent and spiny, corolla white 2-3 cm. in diameter; fruit a capsule 15-20



Leaves, natural size

mm. long, 5.8 mm. wide, with many black seeds. Flowers from February to May.

Reproduction—Seeds.

The same species in lower altitudes and warmer climates makes a much greater growth.

*Cajophora Penthlandii* Don (Fig. 11). Like the last, this prefers the shade of the rocks. Stem slender, climbing, less spiny than *Loasa Cuzcoensis*,



Fig. 16. *Cantua buxifolia*, National flower of Peru



Fig. 17. *Crocopsis fulgens*; Fig. 18. *Calceolaria bartsifolia*

leaves petiolate, the blade 6.5 cm. long, 3-3.5 cm. wide, with white spines. Flowers axillary, peduncles 4-5 cm. long, corolla light red from 25-30 mm. in diameter; ovary very spiney. Fruits conic capsules, dehiscing from the twisting of the carpels, seeds black. Flowers almost all year and particularly if there is water and the place is not too cold.

Reproduction—Seeds.

#### CACTACEAE

*Opuntia floccosa* Salm Dyck (Fig. 12). As one can see from the illustration, this plant grows in "clumps or low mounds sometimes 1 to 2 meters or more in diameter, with hundreds of short, erect branches, covered with very hard, white to yellowish hairs 3-5 cm. long; flowers yellow 5.5 cm. in diameter. In cultivation, loses a great part of its hairiness and grows more slender

and taller. Flowers from September to December.

Reproduction—Seeds or vegetatively by any fragment of the stalk.

*Lobivia corbula* (Herrera) Britton & Rose. (Fig. 13). Like the last, grows in clumps but less extensive with from 10 to 60 individuals or perhaps no more than 50-60 sq. cm., strongly attached against the rocks, each individual 4-10 cm. in diameter, flowers scarlet red, 3 cm. in diameter. Flowers and increases like *Opuntia floccosa*.

#### OENOTHERACEAE

*Fuchsia macrantha* Hook (Fig. 14). The indigenous "quechua" name "coaco huayii" certainly alludes to its habit of growth, hanging down from the fissures of the rocks. Of the flora we are describing, it is the most outstandingly attractive. In the illustration one can see the character of its habit and



Fig. 19. *Salvia biflora*; Fig. 20. *Alonsoa acutifolia*; Fig. 21. *Bartsia gracilis*  
(About  $\frac{3}{4}$  natural size)

those of its flowers and leaves so that here I need give only the measurements of these parts—the blade of leaves 40-50 mm. long, 22-23 mm. wide, flower 56-60 mm. long, 12 mm. wide at the mouth, perianth red, slightly yellow tipped. Flowers from October to December.

Reproduction—Easily accomplished from the woody suckers, which are long, slender and membranous. Tubercles are produced, but these do not grow.

#### POLEMONIACEAE

*Cantua buxifolia* Juss. (Fig. 16). The national flower of Peru bound up with tradition and used in the ornaments of the ancient Peruvians who cultivated it and held it in great esteem as sacred and to be venerated. It is a shrub that reaches 2 or 3 m. in height, at the least, slender, much branched, the stalk woody, the leaves deciduous, these latter most variable in size and form, as one may see from the sketch accompanying the photo-

grapn. Inflorescence corymbiform, pedicels 18-28 mm. long, with 2-3 deciduous bracts, calyx persistent, corolla dark red 70-75 mm. long, 9-11 mm. wide at the middle of the tube, 20-22 mm. wide at the mouth. Flowers at intervals of 2 or 3 months.

Reproduction—Seeds or cuttings. For the latter one should choose young shoots or twigs.

*Cantua candelilla* Brand (Fig. 15). In its general characters this species is the same as the preceding but the corolla is yellow and the stamen and stigma are more exserted. In these rocky cliffs there is a variety with reddish yellow flowers, probably a hybrid between *C. buxifolia* and *C. candelilla*.

#### LABIATAE

*Salvia biflora* R. et P. (Fig. 19). This also is a flower much esteemed and venerated by the ancient Peruvians, considered sacred, commonly used as a decorative *motif* for their pottery, weaving, etc. From 30-45 cm. high—leaves and flowers as shown in illustration, which is natural size; color light red (there is also a rose-colored variety). Flowers abundantly from February to April, but when culti-

vated, in any time of the year.

Reproduction—Seeds.

#### SCROPHULARIACEAE

*Calceolaria bartsifolia* Wedd. (Fig. 18). 20-40 cm. high, stalks woody, Leaves almost sessile, about 7 mm. long and 3.5 mm. wide, inflorescence in racemes with opposite pedicles, 15-22 mm. long, corolla pale yellow, 9-12 mm. in diameter. Flowers from November to April.

Reproduction—Seeds.

*Alonsoa acutifolia* R. et P. (Fig. 20). 40-50 cm. high, woody, slender not more than 2.6 mm. in diameter, 4-sided, leaves opposite, slightly petiolate; corolla pale rose. Flowers from November to May; when cultivated at any time of year.

Reproduction—Seeds.

*Bartsia gracilis* Benth. (Fig. 21). 40-50 cm. high, stalk woody, much branched, leaves and flowers as shown in the photograph, petals of the upper lips red, of the lower, yellow. Fruit a capsule, seeds white, smooth. Flowers from December to May.

Reproduction—Seeds.

University of Cuzco,  
Cuzco, Peru.



## Memo Re Nomenclature of Lilies

1. For valid species and botanical varieties of the genus *Lilium* there are the Latin names accepted as conforming to the Rules of Botanical Nomenclature adopted by International Botanical Congresses. Except when applied to so-called "hybrid species" the names published in *Index Kewensis* are endorsed by the Lily Committee.

II. *Clones*. Many groups of lilies (*Lilium*) in cultivation are clones, each member of which has been derived by the repeated vegetative propagation of a single seedling. Such a seedling may be an outstanding variation within a species or it may be a plant of hybrid origin.

Thus far the clone has not been definitely distinguished from seed-producing varieties or even species in the rules formulated by either International Botanical Congresses or International Horticultural Congresses.

Rules have been formulated by Horticultural Congresses for the use of so-called "fancy names." At the last of these Congresses (1939) the Committee on nomenclature recommended that only fancy names be used for hybrids of horticultural origin.

When modified to apply to clones the rules, already adopted for fancy names, which are especially applicable to the names of clonal varieties of lilies are as follows:

1. A clone that remains true to vegetative propagation can bear but one valid name: somatic variations are to be given new clonal names.
2. The valid name is the earliest that conforms to the rules adopted.
3. The name of a clonal variety shall consist of a "fancy" name beginning with a capital letter.

(a) When a clone is a known hybrid or is of unknown parentage the fancy name may be combined with the genus name, as *Lilium* Golden King, or with the common name, as Lily Golden King. The use of a Latin proper name is hereafter not admissible for any new clone.

(b) When it is certain that a clone is an unusual member of a valid species the clonal name may be added to the correct name of that species.

4. A clonal name already in use should not be used again for another clone even though it be attached to a different species of *Lilium*.
5. Names that are likely to be confused with one another should be avoided.
6. The prefixes "Mr., Mrs., Miss, and Dr.," and the articles "a" and "the" should be avoided in bestowing clonal names.
7. The formation of a clonal name by combining the names or parts of the Latin names of two species that may be the parents is to be avoided; there can be many other different clones of the same parentage.
8. Existing names in common use should not be altered but may be converted into fancy names.
9. In order to be valid, a clonal name must be published in a language written in Roman characters in a recognized horticultural or botanical periodical, or in a monograph or other scientific publication, or in a dated horticultural catalog.

III. *The heterogen or polyploid*. A

group of hybrid lilies of common ancestry that is composed (1) of different individuals or clones or (2) of mixtures of seedlings and clones may collectively be referred to by a "fancy" name followed by the word "Hybrids," as—Backhouse Lily Hybrids.

IV. *Registration of names* for all clones and heterogens developed in America is advised. The Lily Committee of the National Horticultural Society will undertake to keep an accurate check list of such clones. Registration should be made prior to publi-

cation of the name, in order to avoid duplication of names.

V. *Nomenclature reviewed.* The only volume already published on lilies that lists the clones of *Lilium* and differentiates them from species is "Lilies for American Gardens" by George L. Slate. The Second Edition of Standardized Plant Names has adopted and somewhat extended this nomenclature, especially in the designation of new common names.

Preliminary Report of the  
Nomenclature Committee,  
Dr. A. B. Stout, *Chairman*.

## The Illusive Ivy-VII

ALFRED BATES

For gardening purposes the true ivies—which, botanically, compose the genus *Hedera*—may be defined as weak stemmed climbing shrubs (vines) which always develop through two stages of growth: a juvenile or vining state and a mature or aborescent state. In the juvenile state the plant does not produce flowers or fruits; it has alternate leaves which are simple, usually five lobed, and a fan-like venation; climbs by means of aerial rootlets—root-like formations along its stem which function only as a means of attachment; and very freely sends out real roots from any point along the stem when the stem comes in contact with the soil. The mature state develops when the plant reaches, or almost reaches, the top of its support, at which time a very decided change takes place; the leaves become unlobed and thicker in texture; the stems become twiggy, more woody and the distance between leaves is much reduced; no aerial rootlets are produced and cuttings taken from this stage are very slow to send out true roots; and flowers and fruits are formed. The flowers are small, greenish and unattractive; they are arranged in a round umbel at the end of the twig, the umbel may be solitary or there may be several others springing from below the terminal one; the season of flowering is late in the year, seldom before October in the area about New York City. The fruit is a round berry which ripens during the winter and is quite attractive as almost every blossom produces fruit; according to species, the color is dark blue-purple, yellow or red-orange-white has also been reported as albinos of the blue-purple form. When cuttings

from the aborescent stage are rooted the resulting plants retain the mature manner of growth and fruiting.

### PROBLEM OF ORIGIN

Tobler, in his monograph on the genus *Hedera*, gives a very plausible theory as to the origin and development of the genus. He surmises that long ages ago somewhere in northern India the parent of the genus as we know it today evolved from some near relative in the plant family which we now call *Araliaceæ*. Of that long distant past we have no record; but until man has developed some latent sense which will enable him to read the past history of a plant by holding a leaf in his hand we will be compelled to make guesses and draw conclusions. As this study is not a strictly scientific investigation but rather a horticultural handbook for gardeners we may indulge in a bit of imagination based upon what facts we know and the conclusions we may draw from them. Before developing our theory it will be well to cite Tobler's statements as translated from pages 4 and 5 of *Die Gattung Hedera* (The Genus *Hedera*) 1912; the translation of which has been kindly made by Mr. B. Y. Morrison.

"In evolutionary development it is possibly most reasonable to believe that the genus *Hedera* developed from *Gilibertia* and that genus from *Schefflera*. In plant distribution, the genus *Hedera* stands apart as more distinct than any other of the *Araliaceæ*." He then points out in a rather confused manner, that their center is in the tropics and that *Gilibertia* "spreads out in a few species but only to the north (China and Japan). In this northward direction *He-*

*dera* goes further and we may consider as most probable two directions of distribution and development: one out from India (where beside *Gilibertia*, occur many other relatives of *Hedera* particularly *Brassaïopsis*) and one from China. From the Indian mountains the genus goes on but always northward to the Caucasus, the Black Sea and westward into the Mediterranean region. Here it makes a new center of distribution; and its development, part to the north and northwest shores of Africa and part to Europe in the north, goes on." One other quotation may be given here as it will shortly be used, "Several other *Araliaceae* have weak and (with the aid of root-like growths) climbing stems; the genus *Hedera* is the only one with aerial rootlets in all its species. In spite of this, the dimensions of its trunk may exceed those of bush- and tree-like growths."

With the above scientific backing I am presuming to visualize the first prototype of the ivy—note that I say *first* prototype, for the type had not yet been set—as it spreads northward until checked by the frigid climate of the higher Himalayas; so checked in its northward course, it (now firmly established as a fixed type) spreads eastward through China and into Japan and Formosa and westward across Persia, the Caucasus, the Black Sea area and into central Europe from whence it wandered north to the Baltic, west to the British Isles and south to the Mediterranean and into northern and northwestern Africa and out to the Canary Islands. How much of its travels was purely a natural development and how much was due to human introduction, especially throughout the Mediterranean area, is hard to say. Hard to say—because we, in spite of our modern cocksure attitude regard-

ing our investigations into the world's past, do *not* know everything regarding previous land formations, the speed of plant evolution nor the facts of plant usages among prehistoric cults and cultures. Many a plant may have been introduced throughout a wide area because it was held in reverence or considered sacred by migrating peoples; the white iris (*I. albicans*) is a modern example of this fact. So it may be that the spread, through the Mediterranean basin, of the ivy may not have been a natural one but through human agency; for we know that the yellow berried ivy was of sacred significance in the mysteries of Greece and of Egypt, and perhaps in even earlier cults of which even the tradition has been lost. This idea will be developed later on in the study for it may be possible that this yellow berried ivy now known as *H. poetarum* is, or rather was, a hybrid between the ivy of Europe and the red-orange berried ivy of India; the latter species having been brought into the eastern Mediterranean area and it itself died out long before Alexander conquered India. But we have wandered too far ahead both in time and space from the period when the theoretical and adventurous plant was striving in Hindustan to become the progenitor of the genus *Hedera*.

We cannot know from what plant that prototypical Adam of the race evolved; that plant or group of plants has long since passed into the limbo of forgotten things, as all stages of vegetable transition fade out when Nature has achieved the type more suited to endure. We may, however, hazard a guess as to what that long series of developments, from the first start—the cave man as it were—to the finished product as we know it today, was like. If we could only see that gradual evolution unroll before our eyes as a cine-

ma film we might be able to understand why the ivy of Europe sports into so many constant and inconstant forms and why color variegations are numerous only in the latest evolved additions in the group. While we are making guesses we may as well give free play to our imagination provided we start from scientific facts.

Might it not be possible that in this group of plants the memory of all its efforts to express itself, its long line of mutations and semi-mutations, is carried in the plant-consciousness of each member of the group? The word consciousness is used deliberately; there is no reason to think that plants do not possess consciousness of some kind: they respond to soil, exposure, weather vagaries—and who can say they do not respond to human affection for there are too many cottage gardeners who succeed with plants which are failures under the hands of the ostentatious gardener. It may be this memory of their native homes has become so ingrained into their consciousness that it prevents them from making the effort of striving to adapt themselves to new conditions. Science has not yet given the last word on this phase of plant life and may not for many years to come. Therefore, since this is not a strictly scientific paper, we shall indulge in quasi-theories and concede consciousness and memory to this group of plants which are so uniform in habit of growth and so bewilderingly perverse in foliage.

In our imagination let us endeavour to trace the development of the ivy from its first effort to make a separate genus until the prototype of that genus was established. It may have been a rapid change or it may have taken eons before the ultimate ivy became fixed—a set type definitely different from the plant from which it sprang and to which there was no longer a chance of

reversion. The first question which arises is, was its progenitor a shrub or a vine? If a shrub with a self-sustaining stem, how did it become a vine with a stem too weak to bear its own weight even when of greater diameter than many upright shrubs? If a vine, how and why did it acquire the habit of becoming twiggy and shrub-like when it reached the top of its support? Very few vines have this habit. May it not be that this arborescent or mature stage of growth is a return to its earlier form of structure? I am inclined to think that it is and that it evolved from a shrub because if it had developed from a definitely set vine it would surely have shown more "vine-like" characteristics; this point will be stressed later on.

Let us surmise that the first efforts toward the eventual ivy were in a densely wooded area where the young mutation had little chance to survive as a shrub because of the thick overgrowth; but yet had a rugged enough constitution to persist. The crowded growing conditions would explain a gradually weakened stem; but how did it reproduce itself unless at this period it fruited on the weak-stemmed growth? This memory—for it must have fruited then—may also be retained in the plant's consciousness for there is at least one form of the English ivy which bears fruiting spurs along a vining stem, even when creeping along the ground, and while the main stem continues on as a vine. It is easy to understand how a weakened stemmed plant would eventually become a vine; but it is not easy to understand why that resulting plant should not have spread southward as well as northward unless the original mutation had sprung from a plant with a complex which had already developed an aversion to heat. Tobler, surmising the ivy's progenitor evolved from some



plant in the genus *Gilibertia*, points out that that genus was wandering northward; therefore the aversion to heat and dryness may have become fixed even before our adventurous innovator started to establish a clan of its own. It may be noted here that even the ivy of North Africa grows only in the highlands along the coast where conditions are comparatively moist and temperate. Then too, no ivy chooses for itself a position in full sun; but when in its mature state, at the top of a wall or dead tree, it seems to welcome full sunshine. Therefore long ages in the shady and moist conditions of the forest must have set an indelible stamp upon the plant's consciousness for its youth; but in its maturity it expresses its natal desire for sun. So strong is the aversion to sun on its lower stem and root-run that when planted in such conditions it grows with shortened internodes to provide its own shade and old plants with mature tops will have vining shoots at their bases, unless shade is provided by other vegetation; whereas plants with northern exposure or in shady situations make little or no effort to shade their bases. Then too, in the juvenile stage the ivy will climb less readily when planted in full sun and even when it does climb its progress upward is much slower than when growing in shade.

Another point to wonder over is why and how it developed the short root-like processes by which it attaches itself to its support. Typical vines climb by twining around their support, by developing tendrils, or leafy tendrils, or by short tendril-like growths ending in a disc which adheres to the supporting medium; these are true vines and when tendril formations are made they are only at a node. Therefore the ivy did not adjust a tendril-formation into an aerial rootlet for these are formed between nodes. Very few other plants

climb by means of aerial rootlets and many of these are included in the *Araliaceæ*; as cited above, "the genus *Hedera* is the only one with aerial rootlets in all its species." It is therefore reasonable to conclude that the ivy evolved from a plant of this group in which the production of aerial rootlets had become a settled factor. But how and why did this small group of plants retain this characteristic? There is only one answer; it found it perfectly suited to its needs.

#### AERIAL ROOTLETS

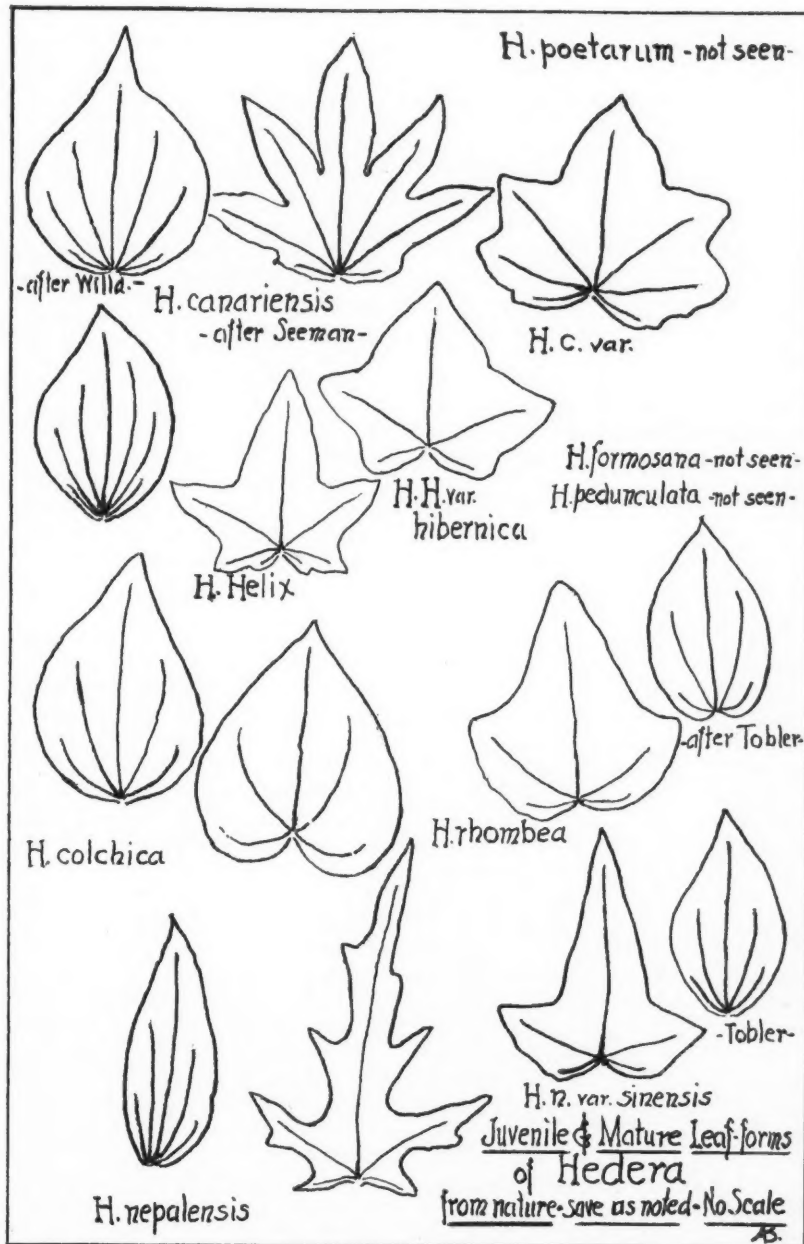
These aerial rootlets merely penetrate into the support, be it stone, brick, unpainted wood or bark, deeply enough to obtain a firm hold; they do not function in any sense as true roots for they do *not* absorb food from their support. In all probability they do absorb moisture, for a house wall covered with ivy is drier after the ivy has covered it than it was before; this, of course, may be partly due to the fact that the foliage both absorbs rain and sheds it off, but the consensus of opinion in England is that these aerial rootlets absorb moisture. That they do not absorb food is clearly proven by the fact that they do not penetrate through the bark of a tree into the sapwood; from my own observations they do not enter into their support for more than a scant eighth of an inch at most. And one may peel an old ivy from a wall or from a tree to prove this fact of shallow attachment. In the case of a tree, only the outer layer of bark will come off; in the case of a wall, nothing or only some tiny particles adhere to the rootlets. In fact, there are numerous cases on record in England of old ivies having acted as a protection to Gothic carvings; for those parts which were covered with ivy have been found to be in a far better state of preservation than those exposed to the weather. We

may therefore conclude that these aerial rootlets are not feeding roots and do not disintegrate masonry.

If, however, a shoot of the ivy is laid upon the ground when these aerial rootlets are beginning to appear, true roots very quickly are formed from among the cluster of embryonic aerial rootlets. One of two things may occur: either some of the embryonic aerial rootlets develop into true roots; or the plant sends out true roots through the aerial-root cluster more readily than from other parts of the stem. Writers on the subject are divided on this point; without taking either side I will merely state my observations. Cuttings with this aerial-root cluster in an early stage of development, when rooted in water where the process may be easily watched, *seem* to develop *some* of the embryonic aerial rootlets into true roots; the same phenomena occur when rooted in sand. When shoots which are still attached to the plant come in contact with the soil, either by chance or by intent, the same thing happens *if* these clusters are still in an early stage of development; and roots from the bare parts of the stem appear at a much later date. But if the aerial-root cluster is fully developed before the test is made, no true roots appear from that part of the stem. Then too, if a shoot is close enough to the soil to feel its dampness—not more than a quarter inch away—embryonic clusters will appear which seem to be drawn down to the soil and develop into, or send out, true roots even though the stem is not in contact with the earth; this may easily be observed in pot plants. Only microscopic daily observations would settle this point for it may be that the plant does not change the function of the embryonic aerial rootlets into true roots but, because that area has begun to develop activity, the plant finds it easier to pro-

duce its true roots at that point than from any other and when once the clustered formation has hardened the true root is no longer able to pierce through.

Continuing to develop our theory of the ivy's evolution we surmise that it started out as a shrub which because of crowded conditions in the forest was forced to grow with continually weaker stems until they were so weak that they could only creep along the ground. At this period it began, through the natural process of layering, to send out roots from along its stems; by so doing the plant found that it not only obtained more nourishment but could grow faster away from plant competition and so it developed the stem-rooting faculty to a phenomenal extent. As the plant grew along the ground, stems which came in contact with a tree or a stone tried to grow on such—the natural instinct of the plant being to ascend into more light and air in accordance with the upright habit of its progenitor. The dampness in the lower bark of the tree or in the stone near ground level induced the continued sending out of roots which found no nourishment or medium in which to develop; for a short space of time the shoot could continue growth upward by leaning against the support, but not for long as its own weight would topple it over and any breath of air would blow it down. But the plant made a very important discovery; when its roots could grow into a split in bark or rock that was deeper than usual those roots obtained some slight purchase which would hold the stem upright for a longer period. This discovery was very important to the plant for it had no parasitical heritage which might have been utilized in developing its stem roots into a strong and piercing process which would penetrate through the bark and into the stone in search of food but it suggested



to the plant that its stem-roots could be altered in their mechanism so as to be used merely as a supporting medium; thus merely using and amplifying an inherited tendency from its ancestor.

So the plant gradually developed some of its stem roots into aerial rootlets as that was more natural than acquiring an altogether new type of mechanism such as a parasitical root would be. It solved the problem economically by converting the energy, which would produce a long true root, into forming a large number of short aerial rootlets in a dense cluster and did not waste any energy in developing them any longer than necessary to obtain a hold, rather relying upon their number in mass formation; then it withdrew its sap from them and allowed them to become firm and dry. While their hold is shallow the mass formation is so strong that often in tearing a stem from its support the stem itself will split leaving a portion of itself still attached to the support. If the theory given above explains the formation of these aerial rootlets it does not solve the problem as to why the plant continues to send out these rootlets from all around the stem even after it has attached itself to a support. If one examines an old ivy one will find a perfect felt of dry and useless aerial rootlets covering the entire naked stem; the same observation may be made on old pot plants. This seemingly waste of energy is easily explained in a pot plant even when the stem has the support of a cane or wire upright for the natural habit of the plant is to grow against a tree or wall and so these rootlets are sent out from all parts of the stem in the effort to reach such a medium and attach itself to it. But with a plant that has attached itself to a wall or tree there seems to be no reason for its continuing the production of

superfluous means of attachment. Two ideas have suggested themselves, one sensible and the other quite fantastic: the plant may have found that this surplus of dried rootlets gave it an extra protection from cold or from gnawing animals—or that the plant was so pleased with its invention that it carried it to excess like a small boy who has just discovered he is able to whistle. After years of work with ivies I am almost convinced that this last suggestion is not as unscientific as it seems on first reading. Whatever reason the plant had for developing this dry felt of useless rootlets it saved the plant any expenditure of energy in the formation of a thick protective bark; for the covering over the sap wood, aside from this felt, is surprisingly thin in comparison with stems of similar diameter of other shrubs.

#### TYPE OF GROWTH

Why every species of the genus should follow the same pattern of so distinct a juvenile and a mature growth is another problem for the imagination to play with. Few other shrubs possess this quality in so distinct a form. Isolated species in several genera exist but no entire genus has so marked a difference of type of growth between juvenile and mature stages of development. This strongly individualistic trait showing how closely the plant's separate species follow the growth pattern of the prototype, points to two conclusions. First, that the genus developed in one place only, thus substantiating Tobler's theory, and so eliminates any theory of the plant having evolved simultaneously in several areas as may have been the case with some other genera such as *Rosa*, *Lilium*, *Rhododendron*. Second, that it existed in a small area where it was under the same conditions for so long a period that its growth pattern had become so firmly

fixed that it could not change it when it began to wander into foreign regions where it met with other conditions, such as open woods or dry climates.

So similar are the various species that botanists now use the arrangement of the small hairs on both the young growth and on the inflorescence as the final distinction between species. This hair-formation is too microscopic for the gardener to bother with until he has exhausted all other means of identification and we will use it only as a final court of appeal. Fortunately there is another mark of distinction, at least between definite species, which is easily recognized by the observing gardener; this is the shape of the leaf and the arrangement of its five main veins. This characteristic will be more fully discussed under the respective species but a few general observations must be made here.

#### VENATION

Tobler, in separating the genus from its near relatives, says on page 3, "*Hedera* always in the majority of the leaves, usually rather conspicuously, shows a fan-like, never a feather-like, venation." In a fan-like venation the main veins all branch out from the petiole at its junction with the blade of the leaf. The arrangement of the main veins forms the skeleton of the leaf formation and so governs its shape. In the ivy there are always *five* main veins—a strong central one and two pairs of lesser ones; sometimes the pair closest to the leaf base is abortive and hardly noticeable but careful examination will show them present, on the other hand some forms of the English ivy not only have the five veins strongly in evidence but have an extra and abortive pair still closer to the base. Now the difference in distance between veins—whether they are widely spaced like an open fan or closer together like

a partly open fan—governs the typical leaf shape of each species. In an open fan formation the pair of veins closest to the central vein branch out approximately at right angles to the central vein and the second pair are below them; they may extend straight out from the base or may curve toward the apex. In a partly open fan formation it is the second pair which is approximately at right angles to the central vein. These observations pertain to typical juvenile leaves; in the mature leaves the fan formation closes, that is the space between veins lessens, in all cases and in proportion to the type of fan formation of the juvenile leaf.

The drawings attempt to show relation between venation and shape in typical leaves of each species in both juvenile and mature stages.

#### RESUMÉ

Let us now sum up these semi-scientific conclusions. The progenitor of the ivy started out as a mutation from some member of the plant order now known as *Araliaceæ* as a low growing shrub in northern India; because of competition with larger plant forms in the crowded forest where it was evolving it was forced to convert its stems into weak, long-reaching growths which soon acquired a habit of rooting as they grew, but continued to retain the desire to ascend; because of this fixed desire to grow in better light conditions it developed aerial roots in order to ascend to them; and while developing such rootlets it changed its leaf shape into a lobed formation following the plan of its main veins in order to lighten the foliage weight, to allow freer air circulation and yet retain as much leaf area for absorption of light and moisture as possible. (In massed foliage, a lobed or a compound leaf shape will allow the enfiltration of light, sun and rain through the leafage more than



would an entire leaf of the same size.) It had, through its inheritance, a complex against heat and dryness and so ever moved northward toward the more moist and cooler conditions of the Himalayas; but did not have the stamina to adapt itself to the extreme cold of the higher levels of those mountains and so its migration was split into an eastern and a western branch. From its beginning in northern India, it persistently retained the memory of its original intention of being a low-growing shrub; and to accomplish that intent it developed the aerial rootlets so it could reach freer air and sunlight and grow as a twiggy shrub according to its original aim. (Arborescent forms will thrive in fuller sunshine than vining forms.) But it was so long defeated in attaining its original intent of being a shrubby plant that its enforced vining became a second nature, a fixed part of its life history, which it now cheerfully accepts.

Its present inordinate tendency to variety of leaf form, as shown in its more recently evolved species, may reflect its experiments with leaf-form in the dense and dimly lighted forests of its earlier life. It undoubtedly had to develop a tendency of adaptability in its childhood; and while the leaf form of our first ivy (*H. nepalensis*) has become fixed in its typical leaves (yet on a large plant one can find an indication of almost every other species-type) in its latest offshoot (*H. Helix*) the leaf forms are illusively Protean. Yet, while leaf shape changed bewilderingly, the type of growth (juvenile or vining and mature or shrubby) has been constant because it has become a fixed complex of its nature (perhaps the modern forms, *conglomerata* and *minima*, are compromises, there is no record of either having flowered). Its susceptibility to variegation may also be a reversion to effects of forest con-

ditions in the long past when there was not sufficient light for the plant to make enough chlorophyll for the entire leaf (in white forms) or sufficient food supply (in yellow forms). Such color variegations having long since died out in the earlier species but, being retained in the plant memory, coming into evidence again in its latest offspring; for most of our colored forms are in *H. Helix*, in its var. *hibernica* and in *canariensis* which may or may not be merely a variety of the English ivy. However, color forms may exist in the older established species which have not been recorded as existing in nature; no cultivated color form of *H. nepalensis* or its var. *sinensis* or any proven color form of *H. colchica* have been recorded and only one color form of *H. rhombea* is known.

#### OUTLINE OF SPECIES

We will now start with the first plant of the fully established genus *Hedera* and trace its gradual development as it wandered away from its first home in northern India and formed other species to the east and to the west of the Himalayas.

We know that first species which established the genus in its present state as *Hedera nepalensis*; in 1853 Karl Koch, a German botanist, gave it this name and described it. It may easily be recognized by its juvenile leaves which are pronouncedly different from all other species, being much longer than wide, of a decidedly grey-green with a narrow greyer band along the main veins, and of a thinner texture. A typical leaf consists of a long drawn-out central lobe with several secondary lobes along either side and two well defined lobes which appear to have secondary lobes near the leaf base but these are really small main lobes as the venation will clearly show; sometimes this second pair is so undeveloped as



to appear merely as notches as the base of the leaf. The venation follows a widely open fan with the first pair of veins set at about a right angle to the central vein and the second and much smaller pair set at a very acute angle to the first pair—and very close to the margin of the leaf. The mature leaf is long and narrow like a willow leaf for the venation has closed like a fan which is almost shut. The fruit is bright orange of rather a reddish tone.

This species is found throughout the whole of northern India and extends far to the east and to the west of its center. Taking first the eastern branch of its development we find that when it reached China a somewhat different type of foliage was evolved; but without sufficiently marked characteristics to be called a separate species. In 1912 Tobler called this form the var. *sinensis*. The typical juvenile leaf is similar to that of the species in color, grey band and texture but differs in that the long central lobe has no secondary lobing and the second pair of lobes is only infrequently suggested although the second pair of veins is almost always in evidence. The pattern of venation follows the type save that the lower pair is less pronounced. The mature leaf is wider and less willow-like for the fanshaped veining has not closed as much as in the type. The color of the fruit, which I have not seen, is as in the species.

Moving on eastward, the genus finally reached Korea and Japan, where it evolved a species which is rather similar to some forms of the English ivy. In 1846 P. F. von Siebold and J. G. Zuccarini gave it the name of *H. rhombea*, which Tobler disputes and has renamed as *H. japonica*; when we reach this species reasons for retaining the first name will be given. The typical juvenile leaf is definitely top-shaped—a strong, longish central lobe with a

pair of broad, shortish lobes and very seldom any suggestion of basal lobes although the basal main veins are usually present very close to the margin of the leaf. I am not certain of having seen the true type, and neither was Tobler; but the variegated form—commonly called “sub-marginata”—is quite common and from it, together with pictures of herbarium specimens and descriptions I have built up its characteristics which cannot be far wrong. The lobing is never deeply cut, the color is a bright dark green and the texture is thicker than in *nepalensis*. The venation is like an open fan with the two side veins almost straight across the base of the leaf and the second pair, when present, curving out below them and merely forming a heart-shaped leaf base. The mature leaves, which I have not seen, are long-ovate or roughly diamond-shaped-rhombic—because the venation has closed its fanshaped formation but not to the extent shown in *nepalensis*. The fruit is “black,” which means it is dark blue-purple and is larger than that of the common ivy. The hair formation is distinct and will be dealt with later.

From this species two others have developed which are but vaguely known and have never been seen by me. A Japanese botanist, T. Nakai, in 1924, gave them the names *H. H. pendiculata* and *formosana*. Tobler says they apparently differ very little from our species (*H. Helix*) and according to Nakai's diagnosis are stellate-haired.” They may merely be varieties or forms of the Korean ivy and until proven material is available for observation they will have to exist in name only.

The western branch of the genus did not develop, at least we have no records of such, a new center until it reached the Caucasus Mountains and the area around the Black Sea where

it founded a new species with another very definite leaf shape. In 1842 and 1859 Karl Koch gave, first as a variety of *Helix* and then as a species, the name *H. colchica*. The typical juvenile leaf seldom has even the slightest indication of lobing although in one form slight notches appear along the margin of the leaves; it is heart-shaped in outline, very large, deep dark green and of very thick texture. This species possesses one very pronounced characteristic which easily distinguishes it from all other ivies: when its leaves, either juvenile or mature, are crushed or are wet a sweet odor is given off. The venation follows the form of a partly closed fan; for the lowest pair of veins, no matter at whatever angle they start out from the base, always sweep out in a curve which eventually ascends toward the apex of the leaf and so forms the heart-shaped base which is characteristic of the species. In the mature leaf the venation follows the complex of the genus and closes its fan-like formation but not as much as in other species; this produces a leaf which is much wider than those of other ivies and is not unlike an aspen or poplar leaf save that its base is more wedge-shaped; it is also larger and thicker than the mature leaves of other ivies. The fruit is very dark blue-purple and is large. It also has another marked characteristic; the new growth is covered with a quite conspicuous downy mass of yellow or yellowish hairs. It is also the strongest growing of all ivies.

In the western part of the area where *H. colchica* predominates the genus begins to develop another species which as it travels westward spreads throughout practically the whole of Europe. In 1753 Linnæus gave it the name *H. Helix* and for almost a century it was the only species known to botanists. The typical ju-

venile leaf is deeply or shallowly five lobed with, in some forms, a fairly constant indication of two additional lobes; of deep green with a more or less pronounced cast of grey which often dulls the tone; of medium size in comparison with other species and of mediumly thick texture. The venation is in the form of a very widespread fan, especially so when the two addition basal lobes occur; which produces a leaf with an overall width approximately equaling its length; furthermore the veins are very prominent in that they are white or very light grey and "raised above the surface like a thread lain on." The mature leaves are ovate to elliptic with a rather long drawnout apex and a rounded base for the main veins close in more than would be expected from their very open formation in the juvenile leaf. The fruit is very dark blue-purple; but there are cases on record of forms which bear white berries.

Throughout the extreme western portions of the British Isles and of southwestern Spain and Portugal, where the mists of the Atlantic create a moist warm climate, the very versatile *H. Helix* has thrown off a larger leafed strong growing variety which may be in process of establishing itself as a distant species. Some botanists consider it so even now. In 1870 Karl Koch gave it the name *H. H. var. hibernica* although Kirchner in 1864 had given it specific rank as *H. hibernica*. The typical juvenile leaf is larger and coarser than the type; is of a yellowish green while young, becoming a deep blackish green as they grow older; is less deeply lobed; very seldom, if ever, develops an extra pair of lobes; is of thicker texture than in the type—I cannot understand why Tobler says they are thinner. The venation follows the plan of *Helix*, save for the extra pair of veins, but the

veins are yellowish green and not at all prominent. The mature leaf is larger and coarser than the type and is much more somber in color. The fruit is also larger but of the same dark blue-purple.

As that mighty wanderer—no one who has ever planted *H. Helix* in good soil and been compelled to leave the garden untended for even a year will deny that it is a wanderer, and if one pauses to compare that year's spread with what space it could cover in a thousand or ten thousand years one must concede it to be the Odysseus par excellence of the plant kingdom—as it traveled into northern Africa and out to the Canary-Azores-Madeira Islands (there must have once been a land connection) it established a very large leaved species which in 1808 was named *H. canariensis* by the German botanist K. L. Willdenow. At present there seems to be much confusion regarding the species itself, but not as to its varieties which are clearly defined but often taken for the species. Plants and specimen leaves received from England do not agree with each other nor with descriptions; descriptions in garden and botanical literature are equally at variance; and it is often confused with the Irish ivy. Tobler is not clear as to its juvenile leaf-form; Seeman gives a drawing of a sharply pointed and deeply lobed leaf as against all leaves received under that name which show extremely shallow lobing; and furthermore, the diagnosis of Willdenow is most unsatisfactory for he seems to have seen mature leaves only. Until we have the true plant it will be well to hold the depth of lobing in abeyance; but judging from the three varieties which I am sure of and which all show a uniformity in major characteristics, I feel justified in venturing the following description. The typical juvenile leaf is larger than *H. H.* var.

*hibernica*; is wider than its length; is five or seven lobed; of a brighter green and of a lighter and less waxy texture. The venation follows the plan of *Helix* even to the frequency of the extra pair of veins but the veins are never outstanding. Its most pronounced characteristic is the heavy light grey downiness on the young growth. The mature leaves, which I have not seen and rely upon herbarium specimens and descriptions, are larger and wider than in *Helix*, "thin" in texture and irregular in outline with a long drawnout apex. The fruit is large and "black."

*Canariensis*, at least in its varieties, seems to me to be closer to *hibernica* than to *Helix*, so much so that I am rather of the opinion that it evolved from the Irish ivy. This theory could only be proven if we could produce substantial evidence that the var. *hibernica* and not the species was the most predominant ivy in southern and southwestern Spain. But, if there is any justification for this theory, then how explain that an earlier mutation produced a mutation which acquired specific rank without itself becoming distinct enough (as yet) to gain that rank? Of course this all goes back to the perplexing question as to just what constitutes a species. In this case we may say that the grey-white felt on the new growth is the point of difference; size of leaf, difference in leaf-color, difference in leaf-shape and larger berries certainly are not enough to justify a species. These variations could all be accounted for by moisture, temperature and soil. So it may be possible that *canariensis* is not a species but merely a variety of *Helix*.

It is interesting to notice that the three largest leaved species are all native to quite similar growing conditions as to moisture, temperature and deep soil; and while increase in size resulted, in each case very different

characteristics were also evolved. In the heavy rainfall of the southern side of the Himalayas, in deep rich soil and a fairly genial climate *H. nepalensis* developed a rather large leaf which is much longer than wide, is deeply lobed and with many secondary lobes and of thin texture, and with a scale-like, but not very noticeable, hair-formation on the new growth. In the moist conditions around the Black Sea, in deep rich soil but a colder climate *H. colchica* evolved a large, thick, unlobed leaf which is fragrant and a rather dense yellow down on the new growth. In the constantly moist conditions, deep soil but very genial climate of the Atlantic islands *H. canariensis* produced a large leaf which is wider than long, more or less deeply lobed, of medium texture and with a very dense grey-white felt on the new growth. We could draw conclusions from these observations if we only knew more about the ivy which is said to be native to the moist warm climate and deep rich soil of Formosa—but even if we did, the evidence is broken for *H. rhombea* from the moisture laden air of Korea and Japan does not have a large leaf; but in this case it may be that this species inhabits the rocky, drier and colder mountains of both countries and that the semi-mythical *H. pedunculata* may yet produce the large foliage which will bolster up our theory. After all there is no

telling what an ivy may do, nor why it does it, nor when.

This leaves us with one "species" unaccounted for; and, as pointed out earlier, this may not have any claim to specific rank. In southern Italy, Greece and western Asia Minor (its existence as a native in Egypt is considered questionable) there is an ivy with yellow berries. In 1827 Bertolini, because of its yellow fruit considered it a species and because of its having been used to crown poets in classic times, gave it the name of *H. poetarum*. It may be that, or it may be merely a variety of *H. Helix*, or it may be a natural or man-made hybrid. So far I have been unable to locate any authentic juvenile plants and until I do there is no sense in repeating the vague and often conflicting descriptions given by various writers. Some years ago a large quantity of decidedly yellow berries was received from Athens but they were either picked too green or were too thoroughly sterilized during quarantine for not a seed germinated either with me or with any other person to whom shares were given. At present both the Brooklyn Botanic Garden and myself have small arborescent plants which are cuttings from an authentic "yellow berried" arborescent plant, fortunately made before it was lost "in the trade." Until these plants fruit and the seedlings grow into large enough specimens for observation comments upon this ivy will not be made.

## Rock Garden Notes

ROBERT MONCURE, Editor

### *Bulbs Here and There*

The flowers of *Iris reticulata* are probably more variable in the wild than is realized by most gardeners, who grow with great regularity either the deep purple type or the light blue "Cantab" form. It has not been my good fortune to wander in the haunts of the iris at its time of flowering, but late in the season somewhere in May I was climbing on Mt. Elwend, in northern Iran, and found unmistakable *Iris reticulata* in surprising plentitude. It grows on the steep stony slopes at about 10,000 feet above sea level in a loose sand, gritty soil. One digs it out in great tussocks, 50 or 100 bulbs strong, not to count the small bulbils with which it is so profuse. During most of the year these slopes are scorched dry, or covered deep in snow and it is just as the snow leaves, whilst the mountain sides are still wet that *Iris reticulata* flowers. The Persian forms of this species are constantly being collected and tried out in gardens, but somehow few but the two standard colors seem to remain.

Of this same fraternity is *Iris Bakeriana*, far less well known in gardens than *I. reticulata* and also possibly less widely distributed in nature. *I. Bakeriana* is rather narrower in flower than *I. reticulata*, a blue-purple, with white and golden markings at the base of the falls. Wandering over the limestone hills north of Marash, in central Asiatic Turkey, one day in late March, hunting for whatever might be of interest, we stumbled across a few lingering flowers of *I. Bakeriana*. It was the first time I had seen the plant. At well over 5,000 feet there was a broken

sloping pavement of huge limestone blocks, and the iris was growing in the thick black soil between these blocks. These little canyons were still cold and wet and a few yards away weeping drifts of snow lingered. The thin grass-like leaves of the iris waved in the chilly breeze. *I. Bakeriana*, unlike *I. reticulata*, did not appear to multiply greatly by division, for there were no dense tussocks of its slender leaves but single plants freely scattered over the whole area, as though the seeds spread easily and scattered far and wide.

Another of this delightful early group of irises is *histrioides* var. *aintabensis*. This has been long in cultivation and is far more dwarf than either *I. reticulata*, or *I. Bakeriana*. It is of a clear, light-blue, with yellow or orange on the base of the falls, and a few black or brown flecks over the yellow. It delights in a fat and heavy soil, far too gross for its dainty appearance. But, such is often the way of the most "fairy-like" flowers. On one of my earlier visits to Turkey we were staying with those most hospitable of people—the American missionaries—in the American Hospital at Gaziantep. It was through these good folks that we found the whereabouts of the lovely little iris. The Kara Tash (Black Rock) south of Aintep is a region of jumbled harsh, black rocks, which appear to have no lime in them. The soil thereabouts is a black-greasy clay in spring and almost cast-iron as the heat of summer advances. *I. aintabensis* has reproductive habits similar to those of *I. reticulata* and when found it is frequently in tussocks containing



large numbers of bulbs. Collecting *I. aintabensis* at the time when the foliage is dying and the seed ripe, the proper time to collect this plant, is extremely hard work, for the ground is already baked solid by then.

All over Turkey and Iran we were tantalized by stray plants of *Iris persica*. Except in the Taurus, where we were fortunate enough to find a most delightful bronzy form in flower, and in the open earthy slopes of western Armenia, somewhere between Sivas and Erzingan, where we found a rather curious "greenish-yellowery" form, I have not seen the plant in flower in the wild. There are a great many variations in colour and some have been given, if not specific, at least varietal rank. *Iris persica* does not appear to be in the least gregarious. One rarely finds a dozen plants within collecting distance of each other, so that it is difficult to be sure what one is garnering. The plant in all its forms is unmistakable with its pairs of deeply channelled grey leaves, lined with a brilliant silver edge. It is extremely difficult to collect really satisfactorily on account of the succulent, swollen roots which spread out from the base of the bulb and are essential to the health of the plant, yet they break off, with a facility most unwelcome, at the slightest touch. Also the plant usually grows in hot hard soil and roots to an incredible depth. But wherever one comes across it, it is always a temptation to try to get it up whole, for leaves alone are so very beautiful.

Whilst in the region of Gaziantep in south Turkey we found in many of the fields the lovely blue bells of *Ixiolirion montanum*. This appears to be somewhat larger than *I. Pallassii*. It grows everywhere over these limestone hills, but is most luxuriant in the cultivated plots and the vineyards where its narrow, dark-brown coated bulbs seem to

have gone down below the normal ploughing depth, and so to laugh at both cultivator and collector and produce great swaths of deep blue flowers on two foot stems every year, where crops should be flourishing.

Iran is often looked upon as the land of tulips. I had expected to find a good many species there. Either I was there at the wrong time or in the wrong places, for the number of species encountered was very small. Perhaps the most charming was *Tulipa polychroma*. In southern Iran, when visiting Lalhezar, I rode up from the tiny village where I had spent the night to the edge of the rapidly receding snows, and all through the lower reaches of that valley, in parched shingles and among a prickly tangle of *Astragalus* and *Acantholimon*, *T. polychroma* was exquisite. The flower, before it opens, is a slender, pointed cone, pink, often almost crimson, shaded slightly with a bluish green. It opens flatly to a six-pointed star of brilliant white, with a golden mark at the base of each petal, and a boss of golden anthers gathered around the pistil. The flower stem is rarely more than 8" tall and altogether it is a very desirable little plant. Further north, around Hamadan, we came across a few specimens of a delicate yellow form of this plant, but what became of them after they reached England I never heard. I fear they went to an early grave, the way of too many desirable collected plants.

*Tulipa violacea* will always be a prime favourite with me, bringing back my first sight of it in northern Iran. On an afternoon in early May, much later in the day than it should have been, I was scrambling toward the top of Mt. Elwend, just outside Hamadan. (As this was my first climb on that mountain I was determined to reach the top of its 12,800 feet.) I had started rather late and had skipped a good





E. K. Balls

*Narcissus bulbocodium*

many of the plants I had seen on my way up in order to reach the crest. I even indulged in the dangerous venture of a short cut over the scree at the foot of the final cliffs, making for a shoulder up which I could climb to the final top. It was in these steep coarse scree that, looking up towards my goal in order to get my direction, I saw, with the light shining through them, drops of a deep claret colour among the coarse and tumbled grey stone. The tulip was freely scattered among these upper scree between the rocks in a gritty sandy soil. But for the great depth of its rooting it would have been comparatively easy to collect. Above the ground it is a dwarf, less than 6 inches tall—a perfect delight. Later we found the same species on the high limestone scree of the Cilician Taurus in southern Turkey—just as dwarf and just as delightful.

It has seemed to me that, in one form or another, *Tulipa montana* is the most widespread species of that genus. I have stumbled across it all over the place, from southern Iran to northern Turkey. It usually likes a hot and dry exposure and not at any very great altitude, though in Cataonia it goes up to about 10,000 feet on Beirut Dag, in the form of *T. Wilsonii* (if my memory serves me rightly). It is to me one of those plants which do not appear "right" in the wild. The flaming scarlet cups, with their black basal markings outlined with yellow, are extremely handsome but somehow blatant among their more modest appearing companions. Not that I feel a good large scarlet flower necessarily out of place in the hills—in fact I am really very partial to *T. montana*—but it somehow seems wrong on a mountain side among rocks and cushion plants. It looks as though it belongs to a good fat garden border. Only in one place have I seen it flowering at all in profusion—at Kop

Dag, between Erzingan and Gumush Hane, in Turkish Armenia, where at about 5,000 feet the narrow valley was as gay with its scarlet as the Gumush Hane hillsides were with the crimson flowers of *Paeonia pubens*. In the limestone Taurus there grows about the most dwarf form of *T. montana*, the variety *Juliae*. This has the earmarks of *T. montana*, grey leaves crinkled at the edges and frequently edged with red, the same great glowing flowers, but a growth no more than 6 inches tall. *T. montana* var. *Juliae* is really very fine, and it is well that it does not appear to bloom at the same time as *T. violacea*, because the two colours would not be pleasant together, though the plants grow on the grey scree side by side.

Tulips almost immediately make me think of daffodils—why I cannot say! They do not always flower together and they don't even belong to the same family! The wild daffodils, however, are delightful and well worthwhile. Their distribution centers largely around Spain and North Africa. The widespread *N. bulbocodium* is the sole member I have actually met in flower in its native haunts, along stream sides in the parched Atlas mountains of southern Morocco (this is about its most southern limit, as it was on the southern slopes of this range almost within sight of the Sahara Desert). Those moist patches in such arid country are indeed surprising. The tiny streams will have a luscious band of turf and flowers, perhaps 18" broad on either side, and beyond all is spines, xerophytes and parched ground. In that moist band *N. bulbocodium* flourishes and flowers magnificently in June on the highest slopes.

My meeting with *Narcissus Watieri* was not one of those accidental pleasures. It was carefully prearranged and every precaution taken to be sure



*E. K. Balls*

*Narcissus Watieri*

that we should not miss. At the time I was very much indebted to Mr. Jean Gattefosse of Casablanca, who helped me considerably during my visit to Morocco and travelled a good deal of the way with me. So, from Marrakesh we drove by car one day over a perfectly good road to the Tizin-n-Test, where, in scattered woods of evergreen oaks, we collected, from the sun-baked slopes, the bulbs of *N. Watieri*. It was not until the following spring, in my own Hertfordshire garden, that I saw the narcissus in flower and found it to be entirely entrancing. Its native home is rather interesting—*N. Watieri* appears to enjoy a really good summer baking. The live oak forests, where it grows, are not dense enough to shut out the sun from the steep coarse screes, and the narcissus prefers the sunny spaces between the trees. Here the slope is so steep and the snow so heavy that the surface is apparently constantly slipping, because most of the bulbs as we dug them were lying on their sides. They were warm as we lifted them out of the ground, and the old coats of many years cracked and readily dropped away, leaving a new golden brown sleek coat nearly as attractive as the flower when it came.

*Crocus* does not genuinely come under the heading of bulbs, but most of us associate them there. There are a few I have met of which I should certainly like to see more in cultivation. Perhaps the smaller species are not happy in cultivation, or are not showy enough; whatever the cause, one rarely sees them. Over half of Turkey, the central plain, *Crocus Danfordiae* is widespread. It has a wide range of colour with white, bluey-mauve and pale yellow as the chief points. The flowers are rather narrow, but often come up half a dozen together from one corm. In the early days of March the bleak and muddy heights above

Chankaya—the elite suburb of Ankara—are studded with this delightful little species, and also with *C. ancyrensis*—a species almost indistinguishable from the golden flowered *C. vitellinus*, except for the covering of the corm. They are both rather larger in flower than *C. Danfordiae* and vary in colour from golden-orange to a pale yellow. These two species spread almost the whole way across the country to the south and range in altitude between 3,000 and 6,000 feet.

In the northeast of Turkey there are some remarkable members of this genus. On our first visit to that part of the world my travelling companion, Dr. W. B. Gourlay, and I were quite delighted to come across the slender golden blooms of *Crocus Scharojani*, flowering in mid-August in the bogs of the high ranges. *C. Scharojani* and its mythical double, *C. Lazicus*, haunt the boggy spots of these Lazistan mountains from about 8,000 to 10,000 feet. The corms are tiny, about the size of a very small garden pea. In *C. Scharojani* they do not reproduce by offsets as is common in *Crocus* but instead produce enormous quantities of seed, which germinate and flower freely. *C. Lazicus* is said to be a stoloniferous species and should be interesting if one could find it! Numerous attempts have been made to grow *C. Scharojani* in cultivation, with only very limited success. Seed germinates readily and plants even continue for some years, but flowers are rather more than rare! In those same mountains the very last of the flowers of the alpine meadows is the dainty, cream-coloured *Crocus valicola*, with its varieties *Suvarowianus* and *lilacina*. These open in armies across the upper meadows just in time to be buried under the first of the winter snows, in the middle of September. *C. valicola*, which makes a corm almost an inch



E. K. Balls

*Colchicum triphyllum*

across, where grown in loose rich soil, around the villages, is dug by the peasants, boiled and used as a vegetable, but being mealy and a little insipid, is perhaps something like what a cross between a potato and a sweet chestnut might be.

Having brought one group of corms into the picture, it would hardly be fair to forget the *Fritillarias*, of which the Near East contains a great number. One of the earliest of my encounters in this genus was with *F. glauco-viridis* in southeast Turkey along a rough road between Adana and Gaziantep. In bright red clayey soil the *Fritillaria* pushed up its grey green spikes through dead leaves before the scrubby woods in which it was growing had begun to show any signs of life. *F. glauco-viridis* is a curiously attractive plant with narrow sharply pendant bells of soft grey-green on the outer

side and a vivid yellow-green inside. The stems are up to 12 inches tall and carry usually a single bell, though frequently have several. It is one of the earliest of these plants to flower, and in England it is usually kept in a frame or cold house on this account. Coming from an altitude of no more than 2,000 to 4,000 feet in southern Turkey, it is probably not very easy to accustom it to a climate with a wet cold vacillating spring. A real dwarf amongst this quaint group is *F. Graeca*, from the steep igneous screes of Mt. Smolica in northwest Greece. The slope was so sharp that it was difficult to climb about on it and every step seemed to set the whole surface of these fine black screes in motion. Here *F. Graeca* was nodding its deep brown-maroon coloured heads in hundreds an inch or two above the surface of the slope. It was here one of the easiest of plants to collect

and seems to be quite happy to have been collected by the comfortable way in which it settled back into cultivation. The twisted grey leaves of this plant are quite distinctive.

On steep slopes in a fine gritty soil in the burn ranges of the Great Atla, I came across in mid-July the dried tufts of foliage obviously belonging to a *Colchicum*. Scattered over the hillsides, these red-brown tussocks showed an abundant supply of the plant. For a *Colchicum*, collecting was easy. I garnered enough well ripened bulbs to assure at least some of the plant showing up the following year in cultivation. The plant turned out to be *Colchicum triphyllum*, one of the most attractive of the spring flowering species. It has an almost globular bloom of pale, slightly mauvish pink, darkened at the mouth of the corolla tube with a shading of purple. The anthers are dark olive-green, and the blooms will appear as many as six to a bulb, with the generosity common to *Colchicum*. Unfortunately, *C. triphyllum* has so far proved fleeting in cultivation either by reason of garden pests, such as slugs and mice, or by reason of short-lived tendency, inherent in the plant—in my personal experience the slugs got it first and very effectively.

A genus perhaps better known on this side of the Atlantic is *Zephyranthes*. The first of these I ever met in its native place was *Z. verecunda*, which seems to have quite a wide distribution in Central Mexico. We came across it on the old lava flow, the Pedregal, just outside Mexico City, and also in regions around the delightful little town of Tlaxcala. *Z. verecunda* varies considerably in form and colouring. In its best forms it is of a rosy apple-blossom loveliness with pure white and yellow inside—very attractive and desirable. This was the Tlaxcala form, though even it was not con-

stant. In its hard lava home on the Pedregal *Z. verecunda* was somewhat washed out, as though the effort of keeping alive in such harsh places was as much as it could manage. Unfortunately the finer forms collected around Tlaxcala do not appear to have maintained their superiority in cultivation.

Climbing upwards from the city of Quito (Ecuador) onto the slopes of Mt. Pichincha, there is a particularly steep cliff in one place, up which one scrambles and pulls oneself by means of various shrubs and lianes. Probably this is not the only place of its kind on those slopes, but it happened to be the place we chose to explore one hot day in the end of July. Emerging from the tangle of bushes, brambles and bamboos, we came out on a sloping ledge, matted with dried grasses and small shrubby growths. Though just past mid-winter—July in this part of the world—there can be some quite hot days! On this ledge spring was already advancing in a show of *Stenomesson aurantiacum*. This is a delightful species with drop-shaped flowers of a beautiful reddish orange colour. The individual bloom is about one inch to one and a half inches long and they are held in loose heads of three or four, each bloom on a slender drooping pedicel. These hang gracefully from the top of a slight, upright stem. The flowers appear whilst the bulb is still leafless, as is so often the case with members of the *Amaryllidaceae*. The *Stenomesson* is frankly gregarious and that gay ledge was well worth the strenuous climb for such a delightful sight. On a still less accessible ledge, just above the little slope of the *Stenomesson* in a tangle of *Opuntia*, shrubby *Satureja stachyoides*, covered with its misty mauve flowers there was a single flowering stem of *Phaedranassa dubia*, another species of the *Amaryllidaceae*.





E. K. Balls

*Zephyranthes verecunda*  
Tizatlan, Tlaxcala, Mexico

The *Phaedronassa* appears to be most unsociable, for whilst it is scattered over a fairly wide area one seldom sees any number in one place. The sandy slopes south of Ambato are perhaps as well furnished as any with its very attractive blooms. The bell is rather narrow, about  $1\frac{1}{2}$  inches long and straight, slightly pendant and held in small umbels of up to half a dozen. In colour it is a rosy, coral red, tipped at the mouth with a pale, almost sea green. The stem is stouter than that of the *Stenomesson* and is about 18 inches to two feet tall. This plant is a real sun lover and it certainly enjoys a sharply drained location and soil. It grows in company with such sun lovers as *Satureja tomentosa*, whose orange scarlet flowers and aromatic leaves call loudly for sunshine and heat, and with *Mentzilia fendleriana* (an apricot flowered member of the South American family of *Loasaceae*), known locally as "pega ropa"

("stick to your clothes") on account of the clinging hairs with which the whole plant is covered.

The tropics also provide bulbous species, many of them particularly handsome but needing greenhouse treatment in cultivation. Approaching Guayaquil (Ecuador) by rail from Riobamba early in January we saw great drifts and swathes of white along the edges of the forest and in moist meadows which looked almost as though they might be bogs. The flowers were too far away to be distinguished as our train rumbled along, but it was not long before we were able to get a close acquaintance with *Leptochiton quitoensis* (also known as *Pamea quitoensis*). Growing in masses along the edges of woods above the cemetery of Guayaquil, we collected through torrential rains, bulbs and specimens of this delightful plant. The flowers are about 6 inches across with a perianth marked by six green dividing veins. The six



E. K. Balls

*Leptochiton quitoensis**Guayaquil, Ecuador, in woods and boggy meadows near sea level*

outer sepals are narrow, about one inch wide, and protrude considerably beyond the perianth, giving a rather ragged effect when the blooms begin to fade. Leaves and flowers are produced simultaneously in great numbers in this warm and humid climate.

Further south along the west coast of South America are the famous *Amancaes* of Peru, also of the *Ama-*

*ryllidaceae*. *Hymenocallis amancaes* looks very much like a yellow counterpart of *Leptochiton quitoensis*, but its flowers are somewhat smaller and its leaves do not appear at the time of flowering. Also the *Hymenocallis* produces several flowers on a stem, whereas the *Leptochiton* has invariably only a single bloom. We were preparing to leave Lima on our northward journey,



E. K. Balls

*Lilium ponticum* in the hills above Trebizond, N. E. Turkey

early in June, and hoped to have a few extra days in which to visit the surrounding country, which is mainly a very dry belt except for the summer fog season. However, shipping arrangements were suddenly altered and we were obliged to get away almost a week earlier than we intended, thus dashing our hopes of any study of the possible flora of these regions. We did succeed nevertheless in making a hurried visit to the Amancaes, by taxi one morning early! A drizzling rain set in as we started out and the roads were slippery as soon as we left the city. The view of the country through which we passed was completely shut out. Officially we were too early for the Amancaes but somehow, in one of those strange tricks of fate, the Amancaes were already flowering quite free-

ly in great patches over the desolate hills. Everyone had told us that it would be another week before the "dafodils" would be in bloom. But for straggling bushes of *Lycopersicum peruvianum* with bright yellow flowers, and little unripe green tomatoes, there was hardly another living plant on those hills. The Amancaes were growing in drifts among tumbled broken rocks and only in the rocky places. Their bulbs were deep down and wedged into the iron hard ground where the broken rocks went considerably below the surface. The moisture had not yet penetrated more than an inch or so of the top crust. It seemed surprising that these flowers were so soon awakened, when the moisture certainly had not yet reached down to their roots and this was the first genuine



E. K. Balls

*Lilium ponticum*

"fog" of the season. It was really more of a "Scotch mist" than a rain!

Perhaps just two of the lilies should come into these scattered notes. The first lily I ever saw growing in its own territory was *Lilium ponticum*. There is some doubt in certain quarters as to the veracity of this name. The species is in any case close to *L. Szowitzianum* and may possibly be the same, or a form of it. *L. ponticum*, as I first saw it, was growing happily in pine woods and on the edges of Oriental spruce forest among bracken, azalea and rhododendron, on the Pontic Hills, immediately behind Trebizond. It is to be found from 200 or 300 feet above sea level to the limit of the tree line at about 8,000 feet all the range, which seems to originate in the Russian Caucasus and runs westwards along the south coast of the Black Sea to fade out between Kerasun and Sivas. *Lilium ponticum* is a slender graceful plant growing up to 4 or 5 feet tall, and producing from one to four of its beautiful pale-yellow "turk's cap" blooms to a stem. The petals are flecked quite freely with deep maroon-coloured markings and the protruding

anthers are a deep mahogany colour with orange-coloured pollen when that is ripe. The whole of this region is moist and heavily forested, so that the acid soil is never dried out, and the lily flourishes all along these cool north slopes. It is delicately scented, rather in contrast to the strong heavy scent of *L. monadelphum*, which shares these hills with its fairer kin.

Later I came suddenly upon another lily, whilst wandering in Greece, *Lilium heldreichii*. This is a true "Turk's cap" with sealing-wax scarlet flowers, slightly smaller than those of *L. ponticum*. *L. heldreichii* was growing in dry, very dry, woodland country in open sunny spaces, where in spite of a heavy growth of bracken the soil was pretty well dried out. Both lilies seem to cling to the bracken association, and many of the lilies I have seen elsewhere also seem to do that, except for some of the forms of *L. monadelphum*, which climb up into the alpine turf in the Pontic ranges, well above either forests or bracken.

E. K. BALLS

Buckingham, Arlington, Virginia

## Rhododendron Notes

CLEMENT GRAY BOWERS, Editor

### *Alphonse Pericat's Azaleas*

The year in which the compact, ever-green Kurume azaleas were introduced to U. S. is still a controversial question, but their enthusiastic reception and widespread planting from about 1920 on is a matter of common knowledge. One natural result was that a few men started crossing these excellent forcing varieties with other types of azaleas. Among these men was Alphonse Pericat, who made a great number of crosses, but who has received

too little recognition. He was a well-known florist in Collingdale, Pennsylvania, a suburb southwest of Philadelphia. In 1931 he exhibited a collection of his hybrids at the Philadelphia Flower Show. These received a great deal of favorable comment, but until recently little more was heard of his work by the horticultural world. Mr. Pericat continued his breeding and selection until his death only a few years ago, but the writer has been unable to obtain many of the details which the

horticultural historian would desire. It is therefore particularly hoped that this brief account will come to the attention of those who can fill in the blanks.

#### PARENTS USED

No records have been found which would indicate the parents used by Mr. Pericat in his crosses, so we cannot be certain as to their identity. However, the fact that the Pericat hybrids are intermediate between the tender so-called "Indian" or "Belgian" azaleas, which are mostly *R. Simsii* hybrids, and the Kurume azaleas, in hardiness, size of flower and leaf, and habit of growth, would indicate that these were the parents most used. Varieties exhibiting some of the qualities of Salmon Beauty, Pink Pearl, Flame, Triumph, Coral Bells, Hexe, Lorraine and Snow may be found among the hybrids. The fact that Mr. Pericat was primarily a greenhouse grower, who probably did very little with hardier varieties, would also suggest the "Indian" and Kurume groups as the most nattedetailed study of azalea heredity will be required before the parent varieties can be absolutely identified.

#### DISTRIBUTION

Mr. Pericat named and introduced himself only one variety—Madame Pericat. However, he sold his mixed and unnamed hybrids rather widely to nurserymen and florists as a result of the 1931 Flower Show, particularly to the Le-Mac Nurseries, Robert Craig and Company, Perkins-de Wilde Nurseries, and Leach's Nurseries. These nurseries grew Pericat's selections for a number of years, tested them in the field as well as in the greenhouse and each selected the most promising for his own purposes. As a result of this further work, at least a score of additional varieties have been named, beginning in 1935 when the Le-Mac

Nurseries named its group of eight. Furthermore, the nurseries named are continuing to work with other selections made by Mr. Pericat and we may expect the naming of at least a few more of these. However, it is possible that here are duplications in the names given some of the varieties, as there has been no coordination and little cooperation between the several concerns involved. It is also quite possible that additional varieties have been introduced without credit having been given to Mr. Pericat, or without coming to the attention of the writer. Some concerns, moreover, are still offering mixed plants simply as Pericat Azaleas and a few of the varieties described herein are not advertised as Pericat hybrids.

#### CHARACTERIZATION

As a group the Pericat Hybrids are somewhat tender but moderately strong growers, with a few exceptions reaching a height of at least four to five feet. The leaves are evergreen and are medium to large. The time of bloom at least in the open is mostly a few days to a week later than such varieties as Hinodegiri, although some growers maintain that they can be forced earlier than the Kurume varieties. The flowers cover a broad range of color, including white, pink, salmon, orange, orchid and lavender shades and include more attractive colors than are found in the Kurume azaleas. The blooms are generally either considerably larger than those of the Kurume group or very much more double; in a few varieties as Rival, they are both larger and more double. The amount of doubling is, however, quite variable between individual flowers of most of the varieties. It is of interest to note that at least some of the very double varieties such as Glory and Richesse are very compact and low growing. The Pericat





*Pericat Azaleas: Symphony, Glory (upper);*

*Rhythm, Hampton Beauty (lower)*

hybrids might in fact be divided into two groups on this basis, as it seems to be a clear-cut characteristic.

In the Norfolk, Virginia region, the Pericat Hybrid plants are perfectly hardy, but in exposed locations the flower buds are sometimes killed by winter temperatures. Farther north these varieties are usually brought into the greenhouse in the fall and treated like "Indian" azaleas.

The variety Hampton Rose is distinctly different from the rest of the

group in almost every way except color, as will be seen by referring to the description following. This would suggest that it may be pure Kurume or at least that it does not contain any "Indian" blood. This may also be the case with Gem. Although these two varieties were bred and distributed by Alphonse Pericat, it might be better not to include them as Pericat Hybrids because they do not possess the recognized characteristics of that group. However, for purposes of record they

are described and included in this paper.

#### PERICAT VARIETIES DESCRIBED

Where the dimensions of the flower are given, the width of the flower is given first and then the length, not including the flower stem. Hose-in-hose, of course, means two complete sets of five petals each, the outer usually being modified sepals. By triple is meant hose-in-hose plus a third set of five petals, the inner usually being modified stamens. Petaloid stamens are stamens which have been modified to become small or large petals; often the anther remains and is attached to the petal. Petaloid sepals are sepals which have been modified to become small or large petals.

**China Seas:** Rose pink flower. Single with petaloid stamens and sepals, all petals distinctly fringed, particularly the modified sepals,  $2 \times 1\frac{1}{4}$ ". Can be forced for Christmas. Introduced by Leach 1937.

**Dawn:** Light pink, slightly violet on opening, nearly white in center. Flowers hose-in-hose,  $2\frac{1}{2} \times 1\frac{3}{4}$ ". Early forcer. Very similar to the later Morning Glow. Introduced by Perkins-de Wilde 1939.

**Fortune:** Cerise red. Flowers hose-in-hose plus petaloid stamens,  $2 \times 2\frac{1}{2}$ ". Early forcer. Introduced by Perkins-de Wilde 1939.

**Gem:** China pink. Flowers hose-in-hose,  $1\frac{1}{4} \times 1$ ". Compact grower and early forcer. Similar to Salmon Beauty. Introduced by Perkins-de Wilde 1939.

**Glory:** Very rich reddish salmon. Flowers triple,  $1\frac{3}{4} \times 1\frac{1}{4}$ ". Stamens mostly lacking. Plant low growing and compact. Introduced by Le-Mac 1941.

**Hampton Beauty:** Bright salmon pink with darker spots. Color mottled,

giving effect of apple blossoms. Flowers hose-in-hose, but outer petals are small and fringed,  $2 \times 1\frac{1}{2}$ ". Vigorous grower and good forcer. Introduced by Le-Mac 1941.

**Hampton Rose:** Carmine pink with paler throat. Flowers hose-in-hose,  $1\frac{1}{4} \times \frac{3}{4}$ ". Leaves small, plant low growing and compact. Earliest azalea in Kurume and Pericat groups to bloom in the open. Hardy as Hino-degiri. Introduced by Le-Mac in 1936.

**Harmony:** Clear rose pink with few faint darker spots. Flower hose-in-hose with occasional stamens slightly petaloid,  $2\frac{1}{2} \times 1\frac{1}{4}$ ". Introduced by Le-Mac in 1941.

**Hiawatha:** Lavender pink. Flowers hose-in-hose,  $2\frac{3}{4} \times 1\frac{3}{4}$ ", and outer petals somewhat fringed. Flowers hold well. Plant said to be hardy at Philadelphia. Sold to Wm. K. Harris, but introduced by Robert Craig Co. in 1942.

**Flanders Field:** Deep poppy red in color. Flowers single, large. Plant strong grower. Introduced by Leach 1938.

**Madame Pericat:** Light pink with shade of lavender, and greenish throat. Hose-in-hose to triple flowers,  $2\frac{1}{2} \times 1\frac{3}{4}$ ". Probably identical with Morning Glow. Late forcer. Introduced by Alphonse Pericat.

**Melody:** Salmon with darker spots. Flowers hose-in-hose  $2 \times 1\frac{1}{4}$ ". Introduced by Le-Mac 1941.

**Morning Glow:** Light pink, white center. Practically identical with Dawn, but later forcer, and possibly smaller flowered and darker in color. Probably identical with Madame Pericat. Introduced by Perkins-de Wilde 1939.

**Orchid (No. 20):** Lavender pink with darker spots. Flowers hose-in-hose,  $2 \times 1\frac{1}{2}$ ". Said to be rather fragrant.

Medium forcer. Introduced by Perkins-de Wilde 1939.

Pride: Light red with darker spots. Flowers hose-in-hose  $2 \times 1\frac{1}{4}$ ". Late forcer. Introduced by Perkins-de Wilde, 1939.

Rhythm: Rich, deep salmon suffused with orange and with prominent darker spots. Usually single with a few small petaloid stamens, some times hose-in-hose, but calyx always normal.  $2\frac{1}{4} \times 1\frac{1}{2}$ ". Introduced by Le-Mac 1941.

Richesse: Salmon with somewhat darker spots. Flowers triple and stamens mostly missing,  $1\frac{3}{4} \times 1\frac{1}{4}$ ". Introduced by Le-Mac 1941.

Rival: Light red. Flowers usually triple, sometimes with additional petaloid stamens,  $2\frac{1}{4} \times 1\frac{1}{4}$ ". Good forcer. Introduced by Perkins-de Wilde 1939.

Splendor: Pink. Flowers hose-in-hose plus occasional petaloid stamens,  $2\frac{1}{8} \times 1\frac{1}{8}$ ". Strong grower and late forcer. Introduced by Perkins-de Wilde 1939.

Sunset: Peach. Flowers triple plus petaloid stamens. Good early forcer. Rather upright in growth. Introduced by Perkins-de Wilde 1939.

Sweetheart: Carmine pink. Semi-double. Flowers  $1\frac{3}{4}$ " across. Early forcer. Buds resemble Sweetheart rose. Introduced by Perkins-de Wilde 1939.

Sweetheart Supreme: Salmon pink. Flowers those-in-hose plus some petaloid stamens,  $1\frac{3}{4} \times 1$ ", some outer petals fringed. Buds resemble Sweetheart rose. Introduced by Robert Craig Co. 1940.

Symphony: Rose pink with tinge of salmon; holds its color unusually well. Flowers hose-in-hose,  $2\frac{1}{2} \times 1\frac{1}{2}$ ". Introduced by Le-Mac 1941.

Twenty Grand: Bright rose pink. Flowers extra large, semi-double.

Strong grower. Introduced by Leach 1937.

The above descriptions have been submitted to the respective introducers, but as the experience with these varieties has been limited, the descriptions must be kept open for revision. Most of the varieties have been studied while in bloom, but in a few cases no plants were available and the descriptions were obtained from other growers.

#### THE PLACE OF THE PERICAT HYBRIDS

The particular adaptation of any new group of varieties must be determined by trial over a considerable period of time. At present it would seem that the Pericat Hybrid azaleas may be particularly valuable contributions to our list of eracaceous plants in three ways:

1. For landscape use in the middle and lower South. Relatively few Pericats have yet been planted outdoors, but our results at Hampton indicate that such varieties as Hampton Beauty and Hiawatha will prove very outstanding in the garden, at least in the Norfolk region, and certainly farther south. The plants have reached a height of four feet and promise to grow to perhaps ten feet under ideal conditions. They are more compact and evergreen than either the Kaempferi or Mucronatum (Ledifolia) types, and come in better colors and with much more double flowers.

2. For forcing in the greenhouse for Easter and for winter bloom. Several of the Pericats are distinct improvements over the present standard Kurume varieties in color, in size and in doubleness of flower. Their wide and rapidly increasing use by florists is certain.

3. In breeding new varieties which will be even greater improvements over present-day standards. The variability as to doubling indicates an unstable genetic constitution which may produce

particularly interesting results by selection as well as by hybridization.

Alphonse Pericat has passed on, but his magnificent azaleas will preserve his name for generations. And, even

after his name has been forgotten, some of his hybrids or their descendants will undoubtedly live on.

H. W. RIDGWAY

Hampton, Va.

## A Book or Two

*Ceanothus*. Part I, *Ceanothus* for Gardens, Parks, and Roadsides, by Maunsell van Rensselaer. Part II, A Systematic Study of the Genus *Ceanothus*, by Howard E. McMinn. Santa Barbara Botanic Garden, Santa Barbara, California, 1942. 308 pages, illustrated.

*Ceanothus*, like some other native American plants, have been highly prized by foreign horticulturists and somewhat neglected by Americans until recently. This book is doubtless the first important and comprehensive publication which deals with the group both from a horticultural and botanical standpoint. The book is written largely from the standpoint of utilization by gardeners on the Pacific Coast, but fortunately, descriptions and notes on hardiness are presented on certain hybrids, largely of French origin, which can be used advantageously in many parts of the eastern U. S. A. The illustrations and printing are above average quality, and the excellent line drawings of the leaf, flower and fruit of each of the numerous species should be helpful in identification. Keys are also furnished to aid in recognition of the various sorts. This work will doubtless stay on the reference shelves for a long time.

Chapters on propagation and culture and also on distribution and fossil history by other authors are included. The collaborative origin of the book

has led to a few oddities of organization and some duplication of material. For example, closely similar notes on plant size, geographical distribution, and certain external characters are found in the section devoted to horticultural notes and again in the portion devoted to taxonomy.

In general, the book is admirable for comprehensiveness but a few lacunae may be found. The notes on propagation could have been extended advantageously in a book apparently intended to aid in popularization of the plant group. Specialized methods of layering used in Europe might have been described, and the discussion on grafting could also have been extended. In our opinion, some nurserymen, at least in the East, may encounter difficulties in rooting cuttings of some of the hybrid forms developed in Europe, although apparently these sorts may be grown from cuttings with ease on the west coast. The behavior of plants with respect to propagation is often quite variable, depending on the climatic zone.

We hope that this book will arouse much popular interest in these valuable plant materials. Some forms of *Ceanothus* may be grown over a large portion of the North American Continent. Doubtless these are many unexploited possibilities in hybridization of this group. The abundant cytological information and the thoroughly modern methods of working out the relation-



1704



*Garden of Miss Allie M. Fectig, Wilmington, N. C.  
Kurume Azalea, Pink Pearl, eight years old*



ships of the various forms used by the authors will doubtless be invaluable to those who attempt the production of new horticultural forms.

V. S.

*Garden Easily.* H. K. Morse. Charles Scribner's Sons, New York, 1942. 208 pages, illustrated. \$2.50.

It is evident that this book was not hastily compiled and it is also apparent that it must be based on the varied experience of the author. Certainly it is a happy coincidence that this book appeared at a time when all gardeners are so pressed for time and strength, and time seems forever nipping at their heels. Even the most avid collector-gardener has much to learn from this book and it is good discipline (it certainly is for the reviewer, who has been accused of having both an omnivorous and omnifarious horticultural appetite). Particularly pleasing and helpful is the introduction, "Garden Easily," followed by "Plotting and Planning for Ease." Other most helpful and interesting chapter headings are "Trees and Shrubs, the Gardener's Best Friends," "Perennials—Well Behaved and Handsome," and chapters on annuals, vines, easy roses, bulbs, water gardens, etc., and ending with "Short Cuts to Lessen Labor." This may seem like a large territory to cover in slightly less than two hundred pages, but the author has escaped being mediocre in selections and general coverage—recognizing the limitations of the book and not trying to name every possible plant shrub or tree, and avoiding the questionably hardy plants. For instance, she has included such things as the Serbian spruce (*Picea Omorika*), *Aesculus parviflora*, *Hippophae rhamnoides*, various flowering crabs, *Hydrangea petiolaris*, shrub roses and the hybrid Musk Rose, *Clytemnestra*, daylilies, Narcis-

sus, *Rhododendron carolinianum*, and warns gardeners to select only non-fruiting or staminate forms of *Ginkgo biloba* to avoid the evil-smelling fruit. The book is both easy and interesting to read, and the few photographs are good, but it is unfortunate that they are so crowded on the pages.

R. C. M.

*Herbertia.* Published by the American Amaryllis Society, Orlando, Fla., 1941. 185 pages, illustrated. \$3.25.

Although this most interesting and worthwhile book is this year dedicated chiefly to daylilies, there is also most interesting and helpful material on narcissus and other amaryllids. Dr. Traub, Prof. Watkins and Mr. Hayward set up standard ratings for evaluation of the many new daylilies which are being thrust upon the market, which should immeasurably aid in bringing order out of chaos. Likewise there are reports from different parts of the country on the new introductions, as well as most helpful articles on breeding by Dr. Stout and Mr. Shull.

It is most encouraging to read the various English accounts and to know that there is still the will to carry on despite the severe bombing of some fine collections of amaryllids. The biographical notes on Mr. George Yeld, Mr. Amos Perry, Mr. G. P. Baker, Mr. Bertrand Farr and Mr. Hans Sass are particularly interesting both from the standpoint of history of daylily breeding as well as the interesting personal glimpses into the lives of those individuals. The many faceted character of Mr. George Yeld has always intrigued me—poet, scholar, teacher, alpinist and horticulturist—and in some details his life might be the prototype for the character of Mr. Chips.

Dr. Traub and the others associated with him deserve great commendation



for the publication of this yearbook in these trying times, and it is hoped that its publication can continue.

R. C. M.

*The Care and Preservation of Cut Flowers*, compiled by Marie L. Kelley for the San Francisco Garden Club. 1941. Second printing. 34 pages. \$.50.

This intriguing booklet is stimulating not only to the ardent flower arranger but to the amateur. He is made to lose his feeling of defeat and frustration, and to go at it again realizing that with a supply of hot water, peppercorns, three kinds of alcohol, and a few other things he can conquer almost any wilting flower.

There are special notes on California native plants and weeds. Ample space for notes is a challenge to experiment and collect recipes.

C. B. M.

*1001 Garden Questions Answered*, by Alfred Carl Hottes. A. T. De La Mare Company, New York, 1941. 386 pages. \$2.50.

A revised and enlarged edition of an old favorite, it has many improvements in text and illustrations. To answer clearly and in a practical manner the more than 1,001 questions of the normal gardener is an ambitious feat. Mr. Hottes does this well.

Among the additions are chapters on "Garden Accessories" and their construction, the improvement of plants through hybridization, "Garden Arithmetic," and a final one called "Monthly Reminders." This is divided according to the various sections of the country. It ends by quoting Karel Capek's unforgettable Gardener's Prayer.

C. B. M.

*Cactus Culture*. Ellen D. Schultz. Orange Judd Publishing Co., Inc., New York, 1942. 180 pages, illustrated. \$2.00.

This volume first appeared in 1932 and its reappearance now brings it to a gardening public which is far more aware than then of the subjects treated.

It is essentially a book for the amateur and probably chiefly for the beginner. It is lucid and forthright with enough infectious enthusiasm to solidify any vacillating interest and enough of sound counsel to make beginning easy.

*A Handbook of Flower Show Judging*. Sarah V. Coombs, for the National Council of State Garden Clubs, Inc. New York, 1942. 90 pages. \$1.00.

Flower shows in their innumerable forms have come to be a part of our national life. They rise and fall with the temper of the times and like other vital expressions alter their expression to fit the necessities of the times. Behind them, however, lies the force of our natural interest in plants and our growing belief in their importance in our national life. The diversity of this interest is reflected in this handbook.

To achieve the necessary completeness, it has been necessary to gather together here the several expressions of the various groups and organizations that have brought forward their own schedules for their particular groups, relating them to the common purpose and offering a modicum of sage counsel to those who may feel uncertain of their way.

To state the author's purpose nothing serves better than to quote the following paragraph:

"Garden clubs are formed for the purpose of encouraging gardening skill and knowledge in their members, an understanding of the science of horti-

culture. This should come first and be most important, but now that the world is coming to realize that flower arrangement is a true form of *art*, even though its handiwork is temporary, no one need be ashamed of an interest in that also. Those whose aim is the honored title of Accredited Judge should be well trained in both the science and the art, with an understanding of the many factors which make up successful flower shows and their judging. They must be judges of whom the National Council of State Garden Clubs may be proud if the title is to have the value which it should."

We commend it to all.

*Modern Fruit Production.* Joseph Harvey Gourley and Freeman Smith. Macmillan & Co., New York, N. Y., 1941. 579 pages, illustrated. \$4.50.

This book is a very concise though adequate review of the latest research work upon the principles involved in modern orchard practices. There are 17 chapters devoted to all the more important phases of fruit production. The space devoted to each topic seems proportionate to the magnitude of the problems involved. Each chapter is complete within itself, yet the chapters are so related to each other as to make the book as a whole well balanced. In addition to presenting the fundamental principles the authors have compiled the best modern practices in such a way as to enable the reader to understand why these practices have been adopted. The reader cannot help but be impressed with the progress that has been made in overcoming the difficulties of the fruit grower, yet he is also aware of the many problems that are still more or less unsolved, and because of which the reader may sometimes wish that the authors would come to a more

definite conclusion as to the practice that is most desirable. The book seems particularly designed for the student, enabling him to acquire a good knowledge of all phases of fruit production with a minimum of effort. On the other hand it brings to the veteran fruit grower the up-to-date information that he may not have had time to gather from the literature available or acquire otherwise.

C. W. C.

*Try Growing Herbs*—Manual for Experimenters. Compiled by Helen M. Whitman for the New York Unit, Herb Society of America. The Tool Shed Press, Bedford, N. Y. \$1.00

There are forty-seven subjects treated in this bulletin, described in alphabetical order on the left hand pages with an entry form on the right hand page to record the success or failure.

The data collected and offered are succinct and interesting but by no means uniform. No recommendations are given as to what parts of the United States would be best suited to the crop, although this may be inferred from the countries of original imports. No suggestions are given as to which plants involve the maximum of hand care in harvest nor are such suggestions as "Use-Cooking" very explicit. It must be recalled however, that the booklet is not intended to be the sole possession of the beginner who will have to know what he is about.

If one is to infer that the book is addressed chiefly to those who wish to grow herbs for their own use, some of the inclusions are curious; if it is to stimulate trade, more data on yields would be helpful, as well as some indication of the minimum quantity that can be sold to the dealer in medicinals or botanicals.

## The Gardener's Pocketbook

### THE MIDWEST HORTICULTURAL SOCIETY

#### *Lilium michiganense*

Although the taxonomists tell us that most of the wild lilies around here are not the old Turk's Cap (*L. superbum*) that it was supposed to be for so many years, yet most persons will still retain the old name.

In the wild this lily is encountered in prairies and under light shade of trees. It is decidedly not a woodland species. Generally it is found in grass and growing in loamy soils. The bulb is a scaly rhizome-like sort and is buried about ten inches below the surface.

The plant is easily transplanted and in cultivation does much better than in the wild. A light soil and a light shade on the soil such as would be given by grass or other low plants are ideal. Inasmuch as this lily is a summer blooming one it is a very desirable addition to the garden. Probably plants can be obtained in subdivided areas where their removal would be a definite act of conservation.

ELDRED E. GREEN

#### *Cornus Mas*

There are many species of *Cornus* or dogwood native to the middle western region. Many of these have entered into cultivation and have proven to be excellent subjects. The European species of *Cornus* are not so well known or are confused with closely similar native material. One of the old world dogwoods that has no native competitor is the Cornelian cherry (*Cornus Mas*). This species is either a shrub or a low round headed tree, depending on culture. While a neat, attractive shrub, during the summer it

has no special merit. In the early spring, though, this is unsurpassed for the quantities of small yellow flowers that literally cover the branches. Many people mistake this for a tall small flowered Forsythia, as the profusion of flowers and color does give much the same effect from a distance. Culturally this is less rampant than most of the shrubby dogwoods and is easily handled. While it grows well as a part of a shrub planting, it shows off best as a specimen where it can be seen during the early spring.

ELDRED E. GREEN

#### *Fagus, the Beeches*

The species of *Fagus* that are found in the Middle West in horticultural plantings are the native one (*F. americana*) and the European species commonly seen in the copperleaved variety. The American beech is a strikingly handsome tree with its distinctive smooth light gray bark and light green leaves resembling an elm in shape. In summer the foliage is a source of excellent shade and makes this a desirable shade tree for lawn or street work. In winter the gray bark is equally attractive, especially when contrasted with evergreens.

The beech is native over most parts of the middle western region and is found on both sand and clay soils. It is not a particularly easy subject to transplant and should be handled in the spring with a ball. Summer care for two or three years until the tree is well established will prove beneficial.

While recommendable as a specimen lawn tree, the beech can be used also for tall screens and hedges. The native beech is the one usually seen growing wild in woodlands. Occasionally specimens of the Copper Beech, a color

form of the European species, are seen. This is distinctive in the bronzy color of the leaves and requires similar treatment to the native one. Generally this would only be used as a specimen, as the material would have to be obtained from nurseries. Either one of the beeches would be something different and out-of-the-ordinary in most parts of this region.

ELDRED E. GREEN

### *Cabbage roses*

Centuries have passed since the Cabbage rose (*Rosa centifolia*) was introduced into cultivation. While the ancient history of this rose is rather clouded by time, certainly the growth of this in the new world is rather well known. Introduced in various ways from the old world, the plants were grown and cherished and precious cuttings or divisions were given to relatives and friends. Gradually moving westward with the early settlers, this rose reached the Middle West and has found a permanent home in the old homesteads and country graveyards. In order plantings there is some confusion of the cabbage rose with other species. The cabbage rose is rather an erect growing bush with many flowers about 2-3 inches in diameter and many petalled. Colors range from pale pink through deep rose to white, the latter being least common. The cinnamon rose (*R. cinnamomea*) has slightly smaller flowers with arching weak stems and flowers that are only partially double and red in color. It is several days or a week earlier than the cabbage roses and is usually finishing its flowering when the other starts.

These two species with the numerous varieties of the cabbage rose and the Harrison yellow constitute the majority of the old fashioned roses in this region. As sure, dependable bloomers they are unsurpassed. A minimum of care is

all that is necessary. Stock of a white cabbage rose was obtained from an old cemetery where it had survived utter lack of care for a half century. Similar instances can be repeated endlessly.

In garden use the old fashioned roses can be used for excellent background work in connection with a rose garden, or as components of the shrub border. Clumps as lawn specimens are often seen.

ELDRED E. GREEN

---

### CORRECTION

It is a matter of very genuine regret that in the last issue of the magazine, the article on page 66, When Does *Lilium*. Catesbaei Bloom, appeared without the name of the author.

This was written by Dr. Foreman G. McLean and our apologies are presented not only to our readers but to Dr. McLean for the oversight. It would be pleasant to be able to blame it to the war and its duties, but this is no excuse.

---

### TO MEMBERS

It often happens that members write that they would like to send in notes for the magazine, but hesitate to do so without specific invitation. From time to time, we try to repeat in the magazine that the magazine is a mutual undertaking and that material is welcome from all members. We have only one rule that cannot be "bent." We do not accept poetry. What we should like most to have are pieces for the Gardener's Pocketbook, reduced to a minimum in this issue, but bulging a little for the next, pieces that will tell about plants that do well for you: with a note as to what they look like, how you treat them and how they reward you. What could be more simple?



4



